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AUTOMOTIVE INDUSTRIES

Vol. 80, No. 15
April 15, 1939

Estimate 1,055,787 As Quarter Output

Hupp "Skylark" Expected in May

Car and truck production for the week ending April 15 was expected to remain at approximately the same level as that in effect during the preceding week. Final figures were expected to show that total output would be in the neighborhood of 83,000 cars and trucks, which represents a very slight decline from that of the previous week.

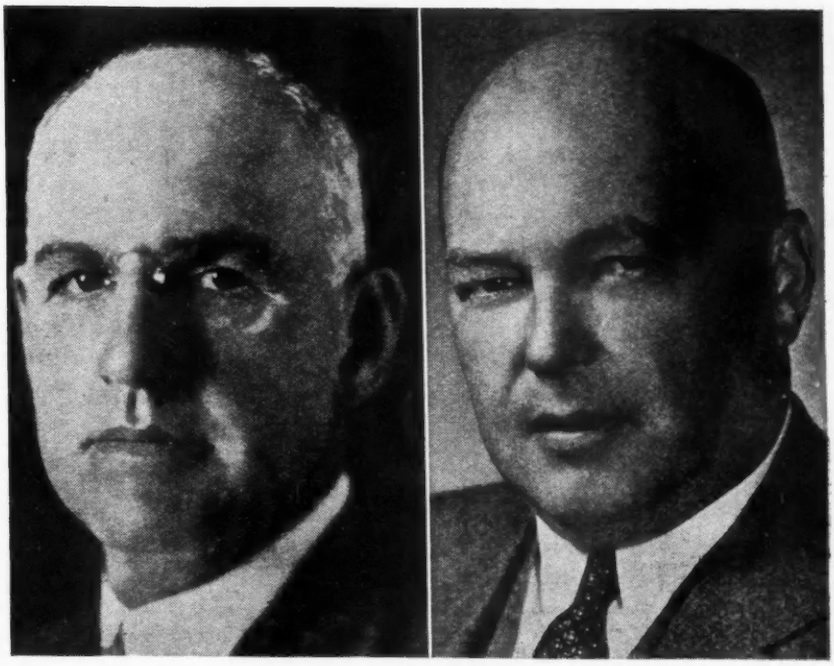
Practically all manufacturers showed little or no change in their production plans for the week, with the slight decline attributable to a few minor changes in individual plant output and to the concentration on sub-assemblies at the Toledo plants of Willys Overland, where no final assemblies were scheduled.

On the basis of present indications the remaining two weeks in April will continue at the rate now in effect, which means that the month should account for slightly more than 335,000 new cars and trucks. March factory sales in the United States and Canada are placed at 389,700 in the monthly estimate issued by the Automobile Manufacturers Association, a total which is somewhat higher than those indicated by preliminary estimates, and is evidence that March was an even better month than originally figured. On the basis of the AMA estimate the production for the first quarter of 1939 is placed at 1,055,787, a gain of 58 per cent over the first quarter of 1938.

Of the current week's total output General Motors, Chrysler and Ford accounted for almost 72,000 units, with total schedules for all divisions of approximately 31,750, 19,550 and 20,600 respectively. Studebaker led the independents with 2804 cars and trucks projected.

Sharp increases in orders and shipments of trucks during March are reported by K. M. Schaefer, general sales manager, Federal Motor Truck Co.

Hupmobile now expects to be in production on its new Skylark early in May. Some bodies already have been received and front end dies are being completed, while an overhead conveyor system is being installed for the production line.—J. A. L.



New Chairman—New President

Alvan Macauley (left), president of Packard Motor Car Co. since 1916, announced this week that, at his request, he will become chairman of the board of the company. At the same time he announced that M. M. Gilman, vice president and general manager, has been nominated to the board of directors as his successor in the presidency. Mr. Macauley said he is freeing himself from the responsibilities of the operating management to concentrate on a long-range expansion program for Packard, which, under his leadership, has shown an increase in net worth from $17,000,000 in 1916 to $42,000,000 in 1939.

Car Sales Called "Loss Leaders"; Service, Accessories Profitable

Nothing in Car Dealer Business to Attract Private Capital, Says NADA

Reaching the conclusion that automobile sales are simply "loss leaders" for the car dealer, the National Automobile Dealers Association has made public the results of statistical surveys made annually since 1933. The survey concludes also that the only thing which saved the reporting dealers from ending these years, with the exception of 1936, in the red was the profit earned in the service, parts and accessories divisions.

The number of dealers reporting each year was as follows: 1933—982, 1934—1,059, 1935—931, 1936—412, 1937—160, 1938—160. The number reporting in 1937 and 1938 may not be deemed sufficient to give an accurate picture of the national dealer situation, however the average of new car units sold by these dealers in 1937 (254) and in 1938 (156) was far above the national dealer average for those years. Although the number of used cars sold by these dealers also declined in 1938

(*Turn to page* 483, *please*)

Japan

A young worker in the training shop of the "Isuzu" truck plant of the Tokyo Automobile Industry Co. Under the National General Mobilization law the government has the right to restrict the number of workers in plants working for peace requirements, to assign them to munition plants and to compel the plants, at their own expense, to train the workers.

Tokyo Bars Registration of Gasoline Burning Motor Cars

Opel and Blitz to Replace Chevrolet in Japanese Market

The Metropolitan Police Board in Tokyo has been instructed by the Home Office to refuse the registration of new passenger cars unless they are equipped to run on charcoal gas or other substitute fuels. The measure was enforced to prevent a possible increase in gasoline consumption.

A further development in this connection was an official decision to prohibit the transfer of used vehicles. This step was taken to forestall any undue boom in the second-hand car business, which was foreseen as a sequel to the ban on the registration of new gasoline cars.

Automobile manufacturers in Japan, including the Japanese branch plants of Ford and GM, have already suspended the assembling of passenger cars for civilian use, with the exception of a few units which are to be equipped with charcoal-gas generating equipment in the luggage compartment. To pass the official inspection, the engines must be without carburetor.

Opel and Blitz Replace Chevrolet

Anticipating complete suspension of car imports from the United States, the Japanese office of General Motors is planning to supply the market with Opel cars and Blitz trucks, made by the German GM subsidiary, learns the *Nikkan Kogyo*. Imports of automobiles from Germany are expected to meet little difficulty under a new German-Japanese trade agreement, which will be announced shortly. Distribution of Opel units in Japan has so far been handled by a German agent. There is a possibility that also other German makes will find a market in Japan when the trade agreement goes into effect. The Japanese agent for Adler, who has been inactive for several years, has already applied for permission to import a substantial number of passenger cars.

Spring Manufacturer Plans Expansion

The Jonan Spring Factory, a Riken subsidiary, has applied for authorization to increase its capital stock. The firm specializes in automotive springs, with production estimated at 200 tons a month. It is planned to increase this capacity to 500 tons a month.

Parts Exporters to Organize

The Department of Commerce & Industry in Tokyo has decided to designate automobile parts and accessories as "important export items," as defined in a pertinent law of 1934.

The law calls for the organization of manufacturers and exporters into guilds under State supervision and compulsory inspection of export articles before shipment. Accordingly the organization of a parts exporters' guild is expected shortly.

American Automobiles Dominate Shipments to China

Though the American and British credits granted late last year to China are approximately equal in size, and were both granted to enable the National Government to buy motor trucks and other vehicles, reports from French Indo-China state that only in American shipments are automobiles the dominating cargo, while British consignments consist mainly of railroad material and war supplies.

More than 500 coolies are daily unloading supplies from incoming vessels which jam the port of Haiphong to capacity, according to the Hanoi newsparer, *Dong Phap*. The report says that American and British goods, mostly railway materials and auto parts, are piled high on the wharves and in open spaces along the waterfront.

Automobile assembling plants in Tonking province are busy night and day assembling parts. During January 700 cars and trucks, mostly of American origin, were shipped into the interior of China via Haiphong, French Indo-China.

Monthly Labor Turn-Over Rate

Monthly turn-over rates (per 100 employes) in the automobile and automobile body industries, as reported by the U. S. Department of Labor, was as follows:

Quit: January 1939, 2.58; February 1939, 1.23; February 1938, 0.47. Discharge: January 1939, 0.04; February 1939, 0.04; February 1938, 0.04. Lay-off: January 1939, 2.52; February 1939, 2.31; February 1938, 6.04.

In the automobile parts industry the rate per 100 employes was:

Quit: January 1939, 0.58; February 1939, 0.50; February 1938, 0.32. Discharge: January 1939, 0.10; February 1939, 0.10; February 1938, 0.09. Lay-off; January 1939, 6.03; February 1939, 5.03; February 1938, 11.73.

Government Contracts

Government contracts for transportation equipment, as reported for the week ended April 1 by the Public Contracts Division, Department of Labor, totaled $3,523,025. The companies receiving the awards, the commodities purchased, and the total amount of each contract follow:

North American Aviation, Inc., Inglewood, Cal., airplanes, $2,346,127.87;

Grumman Aircraft Engineering Corp., airplane parts, $21,726.17;

Sperry Gyroscope Co., Inc., automatic pilots, $44,800;

Luders Marine Construction Co., sailing boats, $39,300;

Fargo Motor Corp., Detroit, Mich., trucks, $16,500;

Chrysler Motor Corp. (Dodge Div.), trucks, $17,376;

General Motor Corp. (Chev. Div.), trucks, $18,005.34;

Fargo Motor Corp., trucks, $609,855;

Steuart Motor Co., trucks, $80,812.98;

General Motor Corp. (Chev. Div.), trucks, $193,209.30;

Theodore I. Fry, trustee, Reo Motor Car Co., motor-vehicle parts, indefinite;

The Gerstenslager Co., trailers, $87,442.12;

Yellow Truck & Coach Mfg. Co. (General Motors Truck & Coach Div.), trucks, cargo and dump, $47,770.96.

Boeing Order

J. E. Schafer, vice-president of Boeing Airplane Co., announced this week receipt of a $300,000 order from the Philippine government for planes, to be constructed by Boeing's Stearman aircraft division at Wichita.

Seek to Organize Aircraft Workers

Fred W. Fryling, president of the Bell Aircraft Local 501 of the United Automobile Workers of America, outlined a resolution adopted unanimously at the recent Cleveland convention of the U.A.W.A. calling for creation of a "committee for organization of aeronautical workers" within the union.

Based on differences in wage scales and working conditions which the resolution holds to be prevalent between aeronautical and automotive plants, and contemplating an organization campaign in the aircraft industry, the document calls for the establishment of two divisions, one each for the east and west coasts of the country.

Beginning with the assignment of at least two paid organizers to each division, the resolution envisages the eventual creation of a "congress of aeronautical workers" whose delegate representation from aeronautical locals "shall be under the supervision and guidance of the international executive board of the U.A.W.A." It was Mr. Fryling who introduced the resolution in Cleveland.

Tranquillo Zerbi

Tranquillo Zerbi, director of Fiat, died March 10 in Torino, Italy, closing one of the most brilliant careers in European automotive history. He was 48, and was taken after a short illness of influenza.

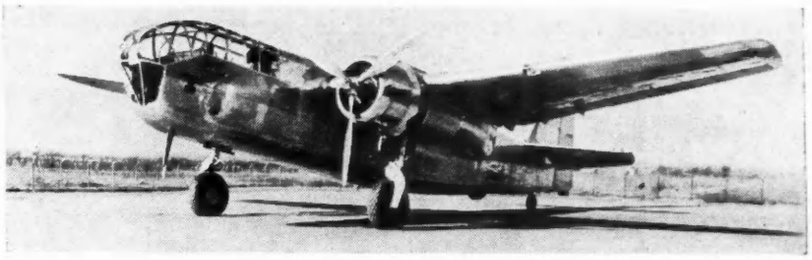
Educated in Germany and Switzerland, Mr. Zerbi joined Fiat in 1919, where his rise to an outstanding position in engineering came quickly. One of his earliest achievements was the design of the Fiat racing cars which won at Brescia and Monaco in 1923.

He turned to aircraft engine design, and was responsible for the famous Fiat AS2, the 1926 and 1927 Schneider Cup winner; the A22 used in the airplane Ferrarin and De Prete flew from Rome to Brazil, and the A22R in which General Balbo crossed the Atlantic.

His last design, the Fiat AS6, is considered one of the world's best high-speed aircraft engines. This engine recently was used in establishing the 709.209 kilometer per hour record.

Free Delivery

Through arrangements recently completed with automobile dealers in Northern California, new automobiles to be brought from the factories near Detroit and Chicago are being placed at the disposal of responsible people who wish to bring them to California as they visit the Golden Gate Exposition. Thus—cheap transportation to the Fair for Mid-westerners and lower delivery prices for West Coast car buyers.



Stearman's New Attack Bomber

Designed to combine the desirable features of fast attack and bombardment craft, the Stearman X-100 was entered in the Army's design competition at Wright Field. Powered by two Pratt & Whitney 1400 hp. engines, it has a gross weight of approximately nine tons, a wing span of 65 ft., and a length of about 52. It carries a crew of four.

Foreign Technical Authorities To Attend SAE World Congress

European Fuel and Automotive Developments to Be Discussed

An imposing array of foreign technical authorities are scheduled to present papers during the World Automotive Engineering Congress of the Society of Automotive Engineers, to be held in this country, May 22 to June 8.

From Italy, in addition to Dr.-Ing. W. P. Ricart and Dr.-Ing. S. Sirtori of the Alfa Romeo plant (see AUTOMOTIVE INDUSTRIES issue of March 4, p. 297), will come G. Gabrielli, director, aviation section, Fiat. Mr. Gabrielli will discuss "Advantages of Three-Engined Aircraft."

From The Netherlands will come J. J. Broeze, J. O. Hinze, and H. Blok, who will discuss "doped" fuels, and fundamental mechanical aspects of boundary lubrication. Famed as one of the world's outstanding authorities in petroleum research, Dr. A. E. Dunstan, whose editorship of the Journal of the Institution of Petroleum Technologists in recent years has vied with his leadership in research work for world recognition. He recently won the Redwood medal of the institution. His subject will be "Today and Tomorrow in Petroleum."

Responsible for the 1931 Schneider speed record fuels, F. R. Banks, London, will discuss "European Aero Engines and Their Fuels," at the San Francisco meeting.

Dr. A. von Phillipovich, who retired from a brilliant record as an educator to become director of Deutsche Versuchsanstalf fur Luftfarht, Luftfahrt, Germany, will present a paper on "Evaluation of the Fuel Test and Proposals for Its Formulation," which promises to be a milestone in petroleum research.

Jean Andreau, one of the leading consulting engineers of France, will discuss what is new in the design of small foreign cars. W. D. Appel, overseas operations division, General Motors Corp., will give a paper on "Composite Frame and Body Construction and Related Problems," and C. G. Williams, technician with the Institution of Automobile Engineers, England, will report on recently completed researches on "Wear of Crankshafts with Copper-Lined Bearings."

E. W. Hives, director and general manager of Rolls-Royce, in charge of aircraft engine design and manufacture, is another representative of Great Britain, and will give a paper on "High Output Aircraft Engines." Major R. H. Mayo will present the latest information on composite aircraft construction, a field in which the British company he founded specializes.

Otto J. Merkel, another representative of the outstanding group of German engineers who will attend the Congress, will discuss helicopters, and Dr.-Ing. H. Altwicker, senior engineer and representative of the director of the division of Elektronmetall, I. G. Farbenindustrie Aktiengesellschaft, will present a paper on "Use of Magnesium Alloys in European Automobile and Aircraft Industries."

Diesel engines will be discussed by several important European authorities, as well as the leaders in this development in this country. F. W. Achterberg, Junkers Corp., Germany, will discuss the role of the diesel in aircraft operation. Dr. S. J. Davies and Dr. Edmund Giffen, King's College, London, will present a paper on "Processes in Injection Systems of Oil Engines," and Torbjorn Dillstrom, Hesselman Motors, Sweden, will discuss the "Single-Plunger Multicylinder Fuel Injection Pump."

Of outstanding importance in the brilliant program of the coast-to-coast Congress will be a paper by Professor Wilhelm Spannhake, one-time chief engineer of Briegleb, Hansen & Co., Gotha, and since 1921 professor of hydraulic engineering, Technische Hochschule, Karlsruhe, Germany. His paper

(*Turn to page* 506, *please*)

Government Awards On Tire Purchases

While the Government, through the Department of Justice, is suing 18 tire manufacturers in the Federal Courts of New York for damages on grounds of alleged collusive bidding on Federal tire requirements, in 1937, the Government is getting a much better break than are consumers on current tire prices, under the contract just awarded the self-same 18 companies for the Government business for the six months starting April 1. The business amounts to about $1,500,000 with the Seiberling Rubber Co. of Akron getting the largest share. Fisk Tire Co., Chicopee Falls, Mass., ran second in winning Government awards, with Firestone Tire & Rubber Co., of Akron, third.

Says the Akron *Beacon Journal* in analyzing the Government bids: Since the time when tire bids of some 14 companies were found to be identical, retail prices have risen about 10 per cent, but the price to the Government has dropped about one-third.

An analysis of the latest awards for Government tire purchases for the six months' period which started April 1, shows the marked decline in bid prices in the past 18 months.

The 6.00 x 16, 4-ply tire was bid at $6.97 in the "identical" bids. In the new awards a $4.64 bid was low. The bids on the 6.00 x 16, 6-ply, were $8.51 and $5.87 for the two bid periods. The price decreases on the two tires in the past 18 months are 33 and 31 per cent, respectively.

The same trend is true for truck tires, and the bulk of Uncle Sam's $1,500,000 in tire purchases will go for truck carcasses. A 32 x 6, 8-ply tire, which was offered to the Government at $16.31 in the identical bids, went for $10.85 in the latest awards, a drop in price of 33 per cent.

Meanwhile retail prices are up and on those three tires are $15.95 on the 6.00 x 16, 4-ply, and $19 for the six, while the truck tire sells to the public at $37.60. The average dealer today pays $10.61, $12.64 and $25, respectively, for each of the three tires.

Libby-Owens-Ford Co. First Quarter Profit

A net profit of $1,722,780 for the first quarter, 1939, was reported by Libby-Owens-Ford Glass Co. at its annual stockholders meeting on Wednesday. This compares with a net loss of $371,527 in the same period last year. "Immediate prospect of the second quarter, however, is not as favorable," declared John D. Biggers, president. "There has been a decline in orders concurrently with the development of a series of crises in Europe and the growth of a feeling of uncertainty in our own country. This will necessarily mean a period of reduced operations in our factories until conditions improve."

Col. S. M. Nicholson

Col. Samuel M. Nicholson, president of the Nicholson File Co. and of the American Screw Co., died at his home in Providence, R. I., April 7, after an illness of several months. He was 78.

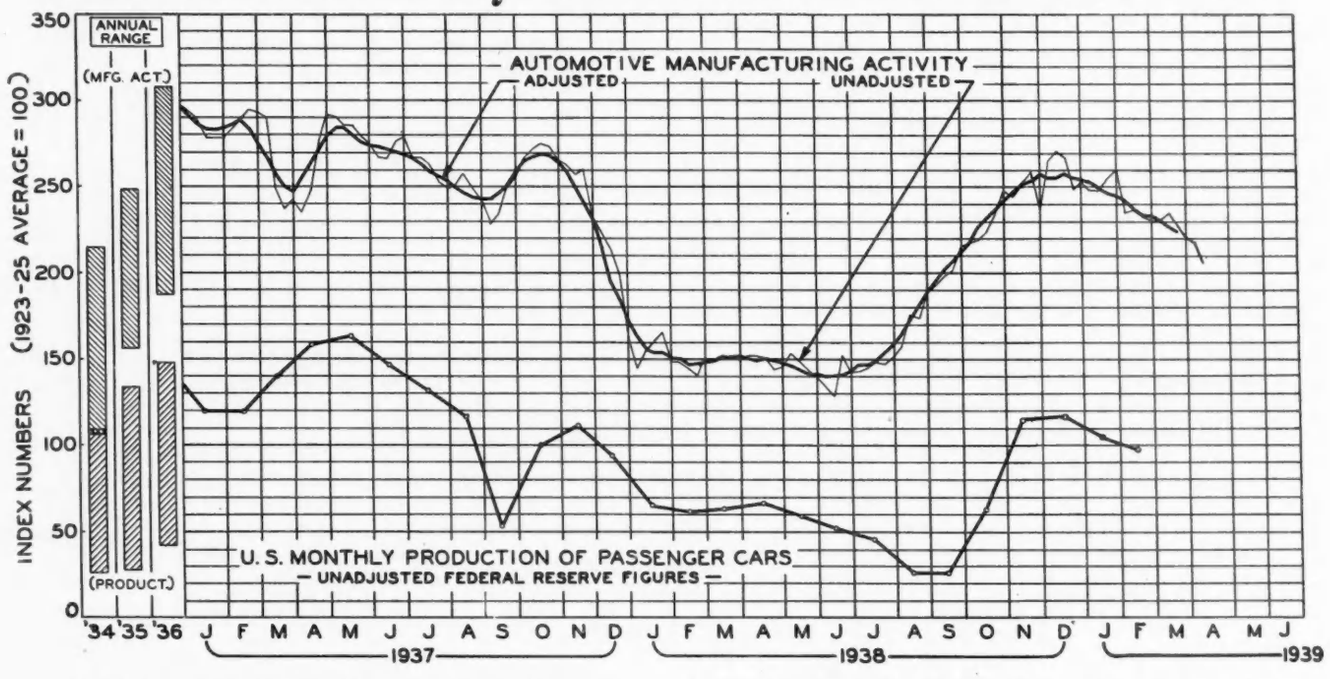
Rubber for Reserve Under Barter Plan

National defense reserves of at least 226,000 net tons of rubber estimated at a value of $85,000,000 would be obtained by the War and Navy Departments if the United States Government succeeds in the proposed direct barter of its surplus cotton and wheat holdings with England, Holland and other countries. The plan also contemplates the accumulation of tin reserves, estimated at a value of $65,000,000, and is a part of the program to obtain strategic materials not adequately produced in this country. It was made known Monday by Senator Byrnes of South Carolina. That it has Administration support was made clear by the statement of the President that he approved the plan. Foreign countries concerned will be approached soon with the exchange offer.

While it is proposed to obtain at least 226,000 tons of rubber, Senator Byrnes said it was advisable to have a stock of at least 1,250,000,000 pounds (625,000) tons or the approximate amount used by American industries annually. Imports of rubber in 1938 totaled about 600,000 gross tons, equal in pounds to 2,500,000 bales of cotton and in value to 5,000,000 bales.

Details of operating the plan have not been announced but it is understood that it would seek to avoid any important fluctuation in the rubber and tin markets. As for the United States Government it was stated that the exchange would be a protection against greatly increased price which would re-

Automotive Activity Index Continues Down to 206



The fifth week of the continued downward trend in automotive manufacturing activity found a sharper decline, with the unadjusted index falling off 13 points to rest on the 206 mark for the week ending April 8. The curve indicating the adjusted index also took a sharper course downward, falling to the 224 mark.

sult in the event of a European war.

The purchases of rubber and tin would be made through the director of the procurement division, Treasury Department, under the advice of the secretaries of the War and Navy.

It is proposed that the cotton and wheat exchanged by this country should be held by the purchasing governments for at least five years unless during that time the market price should go higher than set forth in the agreement. In return it is proposed that this government hold rubber and tin for five years.

"Loss Leaders"

(*Continued from page* 479)

from 1937, the ratio of used cars to new cars sold increased from 1.82 in 1937 to 2.28 in 1938—a high for the six-year period covered in the report.

In considering the status of the new and used car departments only, the report indicates an average loss, per new car unit sold, of $39.14 in 1938. The N.A.D.A. attributes this all-time record loss per new car in part to the fact that the volume of new cars was insufficient to permit a reasonable operation, and fixed new car expense could not be reduced sufficiently to overcome reduced sales income. It was stated that despite a larger gross margin available, amounting to $346.53 per new car unit sold compared to $285.36 in 1937, direct and indirect expense jumped to $356.60, thereby wiping out any profit.

As previously mentioned, from 1933 to 1938 only one year, 1936, resulted in a profit in the sale of new and used cars to the dealers reporting. In 1937 the average loss was $2.58 per new car sold. The 1938 loss of $39.14 was, however, the greatest loss of the period, being more than double that of any of the preceding years.

The 1938 operations of the 160 dealers resulted in an average net profit of $4.24 per new car sold when income from all departments was considered. This compared with an average net profit per new car of $23.20 in 1937 and a six-year average of $10.79. The importance of service, parts and accessory sales was stressed in pointing out that this group of dealers derived 20.82 per cent of their total sales in 1938 from other than their new and used car departments, compared with 16.87 per cent in 1937. From these sales they received 44.82 per cent of their gross margin in 1938; 36.34 per cent in 1937.

"How long automobile retailers can continue to do business under these conditions that have prevailed in the past years," the report concluded, "is a question that calls for an early answer. There is certainly nothing in these figures which would serve to attract private capital to automobile retailing, which should rightfully be one of the most profitable business opportunities in the United States."

ICC to Investigate Rates Of All Automobile Carriers

Ourselves and Government—A Check List Of Federal Action Corrected to April 13

The possibility of any changes in the Wagner Act was seen this week to be hinging almost entirely on the length of the Congressional session. As hearings opened on AFL's proposal to revise the law, odds appeared to be running heavily against favorable action on the bill unless the session is prolonged beyond June 30—the earliest adjournment date so far advanced by some members.

It is viewed as likely that the tendency in the Senate Labor Committee, which is currently holding public hearings, will be to delay possible amendments and that favorable action on the House side is much more certain. Some observers express the opinion that were a vote to be taken today in both Houses, the Senate would turn thumbs down on any change while the House would vote for revision along the lines proposed by the AFL.

The Senate Civil Liberties Committee, in the first of a series of reports on labor policies of employers' associations, charged last week that the National Metal Trades Association had attempted to nullify the operation of the Wagner Act, had threatened expulsion of members for compliance with the act and had maintained a blacklist of active union workers.

Other reports are expected to cover the committee's investigations of the National Association of Manufacturers and The Associated Industries of Cleveland.

Interstate Commerce Commission

The Interstate Commerce Commission on Wednesday ordered a public hearing to begin in Chicago on June 13 as part of a nation-wide investigation of all rates and regulations covering the interstate shipment of new automobiles.

The Commission, which said that automobile manufacturers had promised cooperation, announced the hearings will cover "all rates, charges, rules, regulations and practices subject to the Interstate Commerce Commission Act, affecting interstate transportation of new automobiles whether by rail in carloads or by haul-away, drive-away or tow-away methods or by any of these methods in conjunction with water carriers."

The investigation was requested by the National Automobile Transporters Association, Inc., a division of the American Trucking Associations, Inc., which charged that railroads, in filing reduced automobile rates, had started a rate war that would be detrimental to the public and force members of the industry out of business.

Federal Trade Commission

GENERAL MOTORS EXCLUSIVE DEALER CASE. Hearings resumed in Philadelphia on Wednesday, Chicago hearings, which had tentatively been fixed for April 17 have been canceled. Pittsburgh will be the next hearing spot with a tentative date fixed for April 24.

F.O.B. PRICE CASE. Hearings on GM case concluded last week and the company was given until April 24 to answer FTC charges. A similar case, involving the Ford Motor Co., and charging that price advertising is misleading, is also pending.

SIX PER CENT CASE. Counsel for the General Motors Corp. charged in a brief filed with the Commission this week that the FTC has shown a "reckless disregard for the truth" in press statements regarding the pending 6 per cent case. The 6 per cent plan of financing automobiles was defended as bringing lower financing cost to instalment purchasers and a plan which was adopted by competitors "in appreciation of the benefits accruing to the public" and "in response to demands from retail dealers."

The company listed nine exceptions to the trial examiner's report, contending that its advertising was neither misleading nor unfair; that it had not injured competitors; and that the Commission lacks jurisdiction in the case because the General Motors Acceptance Corp. is not engaged in commerce within the meaning of the Federal Trade Commission Act.

Aircraft Accessories Reports Large Backlog

A backlog amounting to $119,900 is announced by Ted Lynn, president of Aircraft Accessories Corp., Los Angeles. This backlog is the result of orders from Glenn L. Martin Co., Lockheed Aircraft Corp., and the El Segunda division of the Douglas Aircraft Corp. for hydraulic actuating equipment.

At a directors' meeting vacancies were filled on the board by the election of Walter Hamilton, maintenance superintendent of Transcontinental & Western Air, Inc., as chairman; Edmund T. Price, president of Solar Aircraft Corp., and J. H. Newby of Nelson-Douglas Co.

Officers of the company have been authorized to expand the manufacturing, experimental and assembly facilities of the company and to handle its increasing business in the hydraulic field of the aircraft industry.

Acme

Five in a Day

In his "Emancipator VII," Mortimer Auerbach set five world records recently at Miami. Records held in England, France and Italy fell as he set marks for 24 miles, one hour and three hours in the four litre class, and 44 miles and one hour in the unlimited class.

Business Activity Steadies; Price Index Declines to 79.6

An Exclusive and Regular Weekly Feature Written by the Guaranty Trust Co., N. Y.

General steadiness of business activity last week was indicated. The index of the *Journal of Commerce* for the week ended April 1 rose two fractional points to 86.1, as compared with 70.5 a year ago.

Retail trade was sharply accelerated in the final week before Easter; sales volume was from 2 to 7 per cent greater than that of the like week last year, according to estimates of Dun & Bradstreet. Department store sales during the week ended April 1, according to the report of the Board of Governors of the Federal Reserve System, were 7 per cent greater than corresponding sales last year, as compared with a similar margin of 2 per cent for the preceding week.

The output of electricity by the light and power industry during the week ended April 1 was 11.7 per cent above the corresponding production last year, as against a similar gain of 11.3 per cent reported for the week before.

Railway freight loadings in the same week totaled 604,241 cars, as compared with 605,362 cars in the preceding week. Loadings exceeded last year's corresponding figure by 15.4 per cent, the largest weekly gain this year.

Production of crude oil during the week ended April 1 averaged 3,358,200 barrels daily, or 24,150 barrels less than the average for the week before.

Debits to individual accounts by banks in leading cities for the week ended March 29 were 10 per cent below the total reported for the preceding week but 5 per cent above that for the corresponding week last year.

Average daily production of bituminous coal during the week ended April 1 was 1,192,000 tons, as compared with 1,252,000 tons for the week before and 874,000 tons in the like period last year.

Engineering construction awards during the week ended April 6 totaled $57,624,000, slightly less than the figure for the preceding week, but 46 per cent greater than that for the corresponding week last year, according to *Engineering News-Record*.

Professor Fisher's index of wholesale commodity prices declined last week to 79.6, as compared with 79.8. in each of the two weeks preceding.

Reserves of member banks of the Federal Reserve system increased $192,970,000 during the week ended April 5. Estimated excess reserves rose $190,000,000 to a new peak of $3,710,000,000, as compared with the previous high record of $3,600,000,000 on January 25.

GM-Cornell World Price Index

The General Motors-Cornell World Price Index of 40 basic commodities for the week ended April 1 was 60.7, compared with the previous week's figure of 60.8. The United States index in gold decreased 0.2 point.

Frank Teetor

Frank Teetor, 68, head of Light Inspection Car Co., and one of the five Teetor brothers who organized the Perfect Circle Co., died April 6, at Amityville, N. Y., of injuries suffered when he fell under an electric train. He is the third Teetor brother to die within a year. Charles N. Teetor, president of Perfect Circle Co., died a year ago, and John Teetor, associated with the brothers, died recently.

Men

A. J. Auerlich of the Progressive Welder Co., for the past four years in the company's Detroit sales and service division, has been transferred to Dayton, from which place he will handle sales in Ohio and Indiana.

Whipple Jacobs, former vice-president in charge of sales, was elected president at the annual meeting of the directors of Belden Manufacturing Co. In this capacity he succeeds the late **J. C. Belden,** founder of the company, who died Feb. 17.

Louis Fedders, president, and all other officers and directors of the Fedders Manufacturing Co. were reelected at the annual meeting of the company.

R. W. Ayer resigned as chief of the flight branch, Civil Aeronautics Authority, to manage the technical and engineering department of the Aeronautical Chamber of Commerce.

Michigan voters have elected **F. H. Akers,** vice-president and director of sales of the Dodge division of Chrysler Corp., to the Michigan State Board of Agriculture.

Harold S. Falk, vice-president and general manager, Falk Corp., **D. J. Campbell,** president, Campbell, Wyant & Cannon Foundry Co., and **J. R. Allan,** assistant manager of industrial engineering and construction, International Harvester Co., have been chosen by the board of awards, American Foundrymen's Association, to receive gold medals at the association's annual convention, May 15-18.

David Dasso has resigned as vice-president, American Locomotive Co., Diesel engine division. He will be retained in a consulting capacity and also will continue as U. S. representative of Sulzer Bros., Ltd.

Charles Thiede, chief tool engineer, Jefferson plant of Chrysler Corp., has been elected chairman, Detroit chapter, American Society of Tool Engineers. **S. K. Kuhn,** McCrosky Tool Co., has been made vice-chairman; **B. L. Diamond,** Modern Tool Co., secretary; and **L. H. Howe,** Lincoln Park Tool and Gage Co., treasurer.

H. B. Spackman, vice-president in charge of sales, Lyon Metal Products, Inc., was made a director at the recent meeting of the company's board of directors.

J. W. Brussel has been formally appointed factory manager of the Bendix products division, Bendix Aviation Corp., according to a statement by W. P. Ferguson, general manager. Well known in manufacturing circles, Mr. Brussel came to Bendix from Federal-Mogul where he served as factory manager for four years. Prior to that he was works manager of the Timken-Detroit Axle Co. for almost 12 years.

G. S. Martin, for the past two years manager of purchasing and material control of the American Bantam Car Co., has resigned that position. Prior

to his connection with Bantam Mr. Martin was with Willys Overland as assistant to H. J. Leonard, vice-president. From 1929 to 1937 he was assistant purchasing agent of Willys Overland.

Ralph F. Peo, vice-president of the Houde Engineering Corp., has been named vice-president and general manager of the Heinze Electric Corp., Lowell, Mass., which has just been purchased by Houdaille-Hershey Corp., of which Houde is a subsidiary.

H. M. Ainsworth, general manager of the Hotchkiss Automobile Co. of Paris, France, and **Pierre Marchal**, leading French headlight and electric equipment manufacturer, will sail for the United States on the Normandie, May 24. In addition to visiting leading industrial centers in connection with their business, Messrs. Ainsworth and Marchal will attend the A.A.A. congress as delegates of the Automobile Club de France. Other delegates at A.A.A. meeting will be **Viscount De Rohan**, president of the Automobile Club de France and **Count de Liedekerke-Beaufort.**

K. M. Chase, manager of Chevrolet's Pacific Coast region, has been named Atlantic Coast regional manager. Mr. Chase's promotion fills the vacancy created by the appointment of **H. L. Horton** as dealer relations councilor.

At the annual meeting of stockholders of The Glenn L. Martin Co., held Tuesday, the following directors were re-elected for the ensuing year: **Glenn L. Martin, Howard Bruce, John W. Castles, Thomas H. Jones, J. T. Hartson, H. F. Vollmer, B. C. Boulton, M. G. Shook, W. A. Crenning.**

The organization meeting of the newly-elected board of directors was held immediately following the stockholders meeting, the following officers were elected: **Glenn L. Martin**, president; **J. T. Hartson**, executive vice-president; **H. F. Vollmer**, vice-president; **B. C. Bolton**, vice-president; **Thomas H. Jones**, secretary; **M. G. Shook**, treasurer and assistant secretary; **M. R. Schermerhorn**, assistant treasurer.

40 Years Ago

The proposed bill to license vehicle motormen in this country is an imitative measure from French precedents. The most that the law should do is to fix the limit of speed at which motor vehicles can be run in cities. To exceed this simple provision in the attempt to regulate motor vehicle traffic, would be un-American and unwise. In fact, it would be nugatory, for the motor vehicle is coming into general use so quickly and so overwhelmingly, and its advantages over the horse will soon be so clearly demonstrated to all, that an act like that would become a dead letter almost before the ink was dry. Legislators themselves would see its inconsistency.

From *The Horseless Age*, April, 1899.

Sheet Steel Has Good Quarter Due to Heavy Automotive Buying

First-Quarter Shipments Are Highest, Except for '37, Since 1930

While orders from automobile manufacturers fail to come up to the steel industry's expectations, some finishing mills, faring better than others, manage to book a fair run of small tonnage business, which in the aggregate goes far toward supporting a rate of operations that, considering the business situation as a whole, is rather comforting. Heavy buying of sheets by automobile manufacturers was chiefly responsible for the relatively good showing of shipments in the first quarter by the leading interests. Excepting 1937, first quarter shipments of 2,235,209 tons topped the record since 1930. Employed primary capacity this week has receded to 52.1 per cent, the lowest rate since the latter part of January, but finishing mills in some districts are operating at a rate slightly above that of ingot production. With the large consumers buying from hand to mouth, steel producers have adjusted their operations to that condition and pared their ingot reserve accordingly. Prices come in for little mention. This state of affairs is likely to continue until it is sensed that worthwhile business overhangs the market when competition is likely to be sharpened.

The large copper producers announced on Monday that they had met the price reduction of a week ago by the leading custom smelter and, as a result, fabricators lowered their quotations for copper and brass products by ⅜ and ½ a cent per lb. Scrap allowances were revised downward in proportion. Thus the electrolytic copper market, in so far as mine producers and custom smelters are concerned, became uniformly quotable at 10¾ cents, but in the open market metal was freely offered at 10.30 cents, which led to predictions that another cut might be in the offing. European metal markets were closed on Monday in observance of the second of the Easter holidays, and so the influence of European bids was lacking. On Tuesday the export price was at around 10.20 cents.

Whether unsettlement in the tin market resulted from President Roosevelt's proposal of a barter arrangement for the exchange with Great Britain of our surplus stocks of cotton and wheat for tin and rubber or from subnormal demand, was difficult to figure out. On Tuesday buyers showed no interest when spot Straits tin was offered at 46 cents, $4 and $5 a ton below Monday's close. Divergent views prevail among the producers, represented on the International Tin Committee. Dutch East Indies producers believe that the automobile manufacturers of the United States and other consumers of that country will soon be in the market for tin, and that when they need the metal, a few cents more per pound isn't likely to hinder sales. Producers of other countries incline to the belief that to restore normal consumption, prices should be permitted to recede to the lowest figure permissible under the Buffer Pool set-up.

Weakness of copper spread to the markets for other non-ferrous metals. Secondary aluminum was lower in the Detroit market. No. 12 alloy was ¼ of a cent lower per pound and the so-called metallurgical grade, 94 to 98 per cent, sold ½ a cent below previous quotations.—W. C. H.

Germany Increases Its Rubber Tire Exports

Germany's rubber tire exports during January, 1939, increased to 28,480 units as compared to 16,531 in January, 1938, the Department of Commerce has announced. The increase in German tire exports reflects the general trend in all tire exporting countries, according to Commerce Department officials. United States exports of tires in February, 1939, amounted to 92,695 as compared to 59,887 in the same month of 1938.

Countries which increased their purchase of tires from Germany in January, 1939, were British India, Brazil, Belgium, Yugoslavia, Hungary, Sweden, Switzerland and Uruguay.

Honor Beau de Rochas

As part of the S.A.E. activities at the New York World's Fair in May, a duplicate of the tablet erected by the French Society of Automotive Engineers in honor of Beau de Rochas will be unveiled. The tablet will bear the inscription that Beau de Rochas, by the invention of the four stroke cycle, in 1862, laid down the basic principle on which all automobile and aviation engines have been developed.

It is stated by the French Society that the ceremony will be presided over by one of the high officials of the French Embassy at Washington, and will be attended by the 50 French engineers who have already announced their intention of being present at the S.A.E. congress. The unveiling of the tablet will be followed by a banquet offered by the French engineers to officials and members of the S.A.E.

Men and Machines

Forty Years of Machine

By H. E. BLANK, JR.

In April, 1899, the *Horseless Age*, predecessor of AUTOMOTIVE INDUSTRIES, published its first installment of a department devoted to reporting new developments in machine tools, which has been continued faithfully for forty years. An introductory editorial in this "ancient" issue reveals the vision of the editors, who wrote: "The rapid growth of the motor vehicle industry is creating a splendid demand for machinery and machine tools of various kinds. Quite a number of tools and machines are already being adapted to the needs of the motor vehicle manufacturer. Others will be brought out in the near future in response to the increasing demand.

"To those who are fitting up factories for the production of motor vehicles, an opportunity is presented not only of utilizing the very latest and most improved designs of the machine tool builders, but of originating special attachments and tools for the more accurate and economical performance of their work. It has been the custom to postpone this specialization of machinery until the later stages of industrial development have been reached and competition compels a more careful study of the cost of production, but the wisest course is to introduce it at the start, and extend it as experience shows the way. To stimulate invention along this line the department 'Machinery and Tools for motor vehicle builders' has been opened."

There is a real tribute to the machine tool builders in the descriptions of equipment printed in this dusty volume. Your first impulse is to laugh when you look at the pictures of the equipment then offered, some of which are reproduced herewith. But these now-antiquated machines provide jolting contrast with present-day developments, bringing out in bold relief the amazing progress made in the relatively short span of forty years. Here are a few delightful briefs from the forerunner of *Men and Machines:*

"The grinding machine is destined to play an important part in the manufacture of motor vehicles. It is taking the place of the lathe in many of the best machine shops of the country for cylindrical work of regular shape, straight or taper, up to 30 by 4 in., or even 48 by 7 in. on machines of larger size. It obviates entirely the use of the file in finishing, and enables the manufacturer to turn out work in large quantities with ordinary operatives, as feeding and sizing are all automatically attended to.

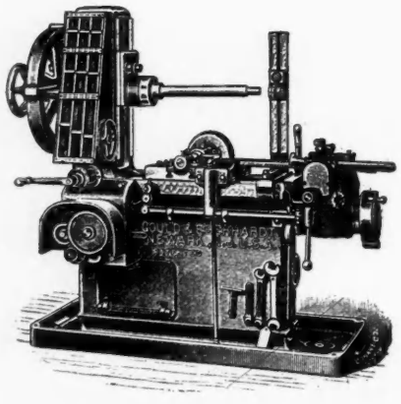
"The Brown & Sharpe Mfg. Co., of Providence, R. I., have recently designed a very complete Plain Grinding Machine for work of this class. After roughing out in the lathe, they claim that shafts can be sized much quicker on such a machine than in the lathe, and with better finish and greater accuracy on unhardened material.

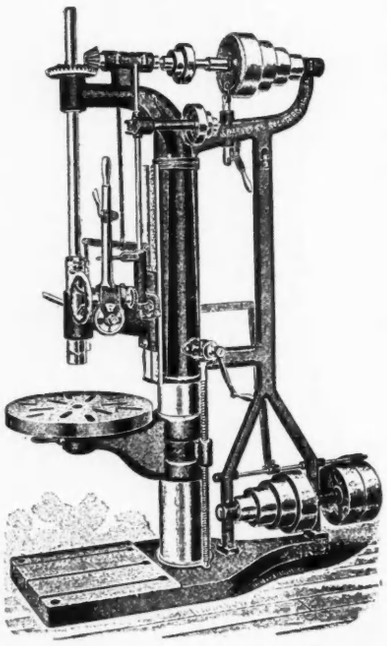
"Another very useful grinding machine is the Disc Surface Grinder, manufactured by the Geo. Gorton Machine Co., Racine, Wis. It is provided with four steel discs, gluing up press, wrenches, countershaft complete, a gallon of special quick setting cement and other accessories.

"Gould & Eberhardt, of Newark, N. J., have brought out an innovation in the gear cutting line, which cuts gears without further attention than the setting. Only one belt is used in driving, the pulley shaft being geared direct with the dividing, cutting and driving mechanism, respectively. All are driven and drive their respective movements by spiral gearing and furnish positive separate movements. The improved positive dividing mechanism is a decided feature. The worm wheel is made in two sections and is positively correct. By the simple movement of a lever, the worm can be engaged for working and disengaged for testing."

W. F. and John Barnes Co., Rockford, Ill., announced a new 26-in. drill. The report stated, "In this tool will be found an entirely new feature in sliding drills, namely, a combination lever, wheel and power feed. With this arrangement of feeds a drill is secured that has the range and capacity of work required in both a stationary and sliding head drill of the same size."

We would like to tell you more about these early machines, but space for this column is limited and, also, we wish to describe several of the latest offerings. Among the latter is a small motor-generator type arc welder having both job selector and current control calibrated and equipped with dials which indicate the type of work and number of amperes for all settings. At the lower parts of its range, the welder delivers a current of light penetration characteristics for the welding of extremely light-gage material. At the upper portion of its range it delivers ample current for the speedy welding

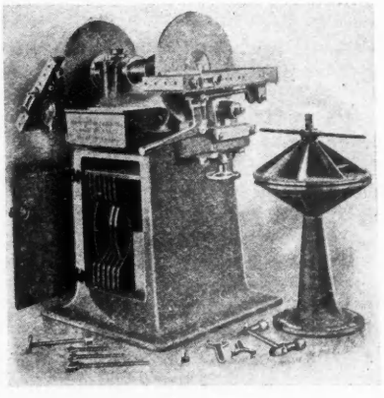




(above) W. F. and John Barnes Co.'s 26-in. drill

(left) Gear cutting machine by Gould & Eberhardt

(right) Gordon disc surface grinder



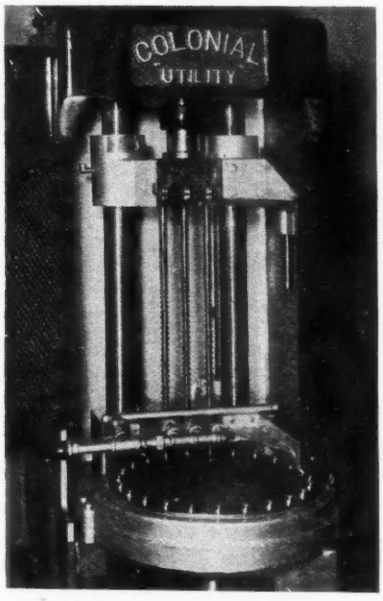
Tool Progress

Horseless Age, *Predecessor of* Automotive Industries, *Inaugurated a Special Department for Reporting New Equipment Developments in April, 1899*

Lincoln Electric Co.'s new small arc welder with self-indicating dual continuous control.

of heavier materials. The welder's current range of 45 to 200 amp. fits it for sheet metal work, hard facing, pipe welding, cast iron repair, regular production welding involving steel, alloy and non-ferrous plates and shapes. It can be used with either bare or shielded arc type electrodes. The Lincoln Electric Co., manufacturer, designates the machine as model SA-150.

The formation of fatigue cracks in piston pins has been virtually eliminated by a well-known automobile company by the simple expedient of finish



Colonial broaching machine

broaching and burnishing the bores of the wrist-pins. The operation, performed on a Colonial Utility broaching machine with hydraulic automatic index table designed for continuous cycle, is exceedingly fast, some 1400 pieces per hour being produced on this single machine.

Three pieces are finished each stroke of the ram, the operator merely loading the indexing table, which indexes an amount equal to three pins for each stroke of the ram. After broaching, the pieces are automatically ejected. The broaching operation eliminated circular tool marks within the bore of the pin—found to be the cause of occasional failure due to the formation of fatigue cracks starting at the tool marks.

At the top of the broaches are circular burnishing rings to complete the operation in one stroke.

Stainless steel pump: Model 2K announced by The Duriron Co., Dayton, Ohio, for handling corrosive liquids. Both suction and discharge are 6 in. integral flanged openings. Closed impellers up to 13½ in. diameter, and open impellers up to 14 in. diameter are available.

High pressure cylinders: Designed for maximum operating pressure of 1500 lb. and available in 10 types of mounting with diameters ranging from 1½ in. to 8 in. Cylinders are of centrifugally cast high test iron, as are the cylinder heads and pistons. Heads and glands are secured by heat-treated alloy steel socket head cap screws. Pistons are fitted with "Step Seal" rings. Piston rods are made of heat-treated alloy steel, turned, ground and polished. "Differential" piston rods, the areas of which are one-half the cylinder area, are optional features.

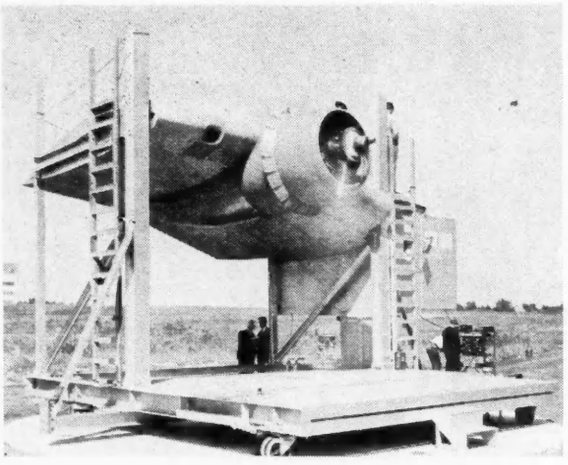
Air-operated welding electrode dressers: Offered in two types, a "flat-plate" and a "shank" type. The former is designed for use where there is restricted space between electrodes but, like the shank type, may be used for all other welding electrode applications. The manufacturer, Progressive Welder Co., Detroit, claims that these dressers will cut loss of time due to usual removal of welding points for reshaping, or eliminate inaccuracies of hand filing of mushroomed points. Dressing is said to require only a few seconds.

Saw for continuous sawing and filing: Built entirely of arc welded steel construction by the shielded arc process of The Lincoln Electric Co., Cleveland, and manufactured by the Tannewitz Works, Grand Rapids, Mich. The machine will handle ferrous or non-ferrous materials and is equipped with a two-speed ½ hp. motor which minimizes belt wear and permits quicker changes of speed. Saw blade speed may be varied from 60 to 650 ft. per minute.

Ratio counting scales: Exact Weight Scale Co., Columbus, Ohio, enters the field with several new models. Material to be counted is placed on the platform of the scales and a few pieces are placed in a ratio pan. The pan is moved along the beam until it balances and an indicator above the pan shows by direct reading how many pieces are contained in the load on the platform.

Railroad car spotter: Link-Belt Co. offers two models of vertical capstan type designated as No. 5-A and No. 10-A, respectively, capable of 5000 lb. rope pull or moving one to three cars, and 10,000 lb. rope pull or capacity to move three to six cars, depending upon track conditions. The machine employs a high torque electric motor connected to spotter drive mechanism by an encased flexible roller chain coupling, and mounted with the spotter on a welded steel base plate.

Rollaway jack: Latest addition to the Yale & Towne Mfg. Co.'s line. Designed for use in conjunction with one to ten Rollaway Re-Nu top skid platforms (also a new addition).



Test Rig

Shown here testing the engine of the new Martin Patrol Bomber, recently completed for the U. S. Navy, is the engine test rig of the Glenn L. Martin Co. Use of this rig enables engineers to determine operating characteristics of a new plane's power plants months before trial flights are possible.

Transportation of Foodstuffs Shifts from Rail to Highway

Comparison of 1920-1938 Shipments Reveals High Percentage Now Traveling by Truck

A comparison of the transportation of foodstuffs to city markets in 1920 and in 1938 reveals what an extremely high percentage has shifted from the rails to the highways. Significant, too, is the fact that food products are in the high revenue brackets of freight.

In the transportation of livestock 1938 found five times as many hogs, eight times as many sheep and lambs, 10 times as many calves and 20 times as much cattle traveling to market by truck, as compared with the amount carried in 1920. That this increase is not merely due to an increase in the total amount of livestock carried to the country's markets is evident from the facts that, in 1920, 93 per cent of the hogs were hauled by the railroads; in 1938 only 27 per cent traveled by rail. In 1920, 98 per cent of all cattle went to market in cattle cars—in 1938, only 47 per cent. The percentage of sheep and lambs carried by rail dropped from 96 to 70 from 1920 to 1938. Calves, too, deserted the railway for the highway—93 per cent going by rail in 1920, while 1938 found 65 per cent traveling in trucks.

Dairy products also are finding their way to the city markets by truck in large quantities. Nearly 10 per cent of the butter and 25 per cent of the eggs consumed by New York now reach that market by truck. Chicago, a railroad center, receives nearly 50 per cent of its eggs by truck.

Trucks carry only 5 per cent of Philadelphia and Boston's butter, but handle nearly 50 and 25 per cent of the eggs sent to these respective markets. Seventy per cent of Philadelphia's milk travels via the highway, but 80 per cent of Boston's milk travels by rail—nearly 70 per cent of the milk consumed in Boston coming not from Massachusetts, but from the neighboring State of Vermont.

Fresh fruits and vegetables in large quantities have become a source of revenue to the truckers. A survey of the country's 12 most important market cities reveals that 40 per cent of these products now arrive via highways.

The true scope of truck transportation of foodstuffs appears even more impressive when it is remembered that many, many cattle, sheep, hogs, lambs and a large amount of live poultry, are delivered by trucks directly to individual markets and butchers and never go through the ordinary markets. Then, too, there is that even greater volume of products of animals, beef, chops, cutlets, sausage, poultry, etc., that reaches wholesale and farmers' markets by truck already dressed. These same products are sent to city dwellers and to retail stores by farmers.

Separate studies made by the Interstate Commerce Commission, Bureau of Statistics, of the freight tonnage handled by railroads seems to bear out the foregoing facts. They show that agricultural products moving by rail have declined about 20 per cent since the beginning of the depression in 1929, and the rail tonnage of farm animals and products of them has declined about 40 per cent. The rail tonnage of less than carload, or package freight, has declined about 50 per cent. This decline in rail tonnage is not due to a lack of something to haul, as these figures are adjusted on a basis of actual tonnage available.

As mentioned previously, foodstuffs are among the highest revenue yielding freight. Products of agriculture, for instance, are transported at about $5.40 per net ton average; animals and their products yield about $10.16 per ton in revenue and less-than-carload-lot freight yields about $15.27 per ton handled. These three heavily paying classifications are rapidly leaving the rails, while the bulk of the low revenue yielding products of the mines, $1.80 per ton, and products of the forests, $3.87 per ton, remain.

Turkish Trade

Tariff Reductions In New Agreement

The United States entered into its 21st trade agreement with a foreign government early last week by signing a trade agreement with Turkey, which, among other concessions, granted tariff reductions of 60 per cent on all passenger automobiles, chassis, bodies and parts.

The general rate of duty on passenger automobiles in the weight category of 900 to 1300 kilos was equivalent to 62 per cent ad valorem. The reduction means a new rate equivalent to 25 per cent ad valorem. In this classification, which includes most low-priced American-made cars, this country supplied 96 per cent of the total Turkish imports in 1937.

In the weight classification from 1300 to 1750 kilos, in which this country sold 97 per cent of total Turkish automobile imports valued at $199,000 in 1937, the previous general rate has been 69 per cent ad valorem. The concession brings the general rate of 69 per cent ad valorem down to 28 per cent. On chassis weighing from 1100 to 1500 kilos, which constitute the bulk of motor vehicle chassis imports and the largest item in terms of value, the effective rate of duty has been reduced from an ad valorem equivalent of 55 per cent to 22 per cent.

In 1937 American-made chassis shipped to Turkey consisted almost exclusively of truck chassis and were valued at $1,200,000.

Asbestos brake linings exported to Turkey will hereafter enjoy a reduction of 5 per cent from the general rate under the trade agreement just negotiated.

Bound on the free list of products imported from Turkey was chrome ore and emery ore. The former has previously been bound under the trade agreement with the United Kingdom.

Honeymoon Is Over

More vigorous enforcement of the Federal Wage and Hours law may be expected in the future, Elmer F. Andrews, federal administrator of the wage and hours division of the U. S. Department of Labor, said in an address at Philadelphia last week.

Reviewing the activities of the enforcement division of the act since its passage, he said a cautious course has been followed. "We wanted to give business ample time to adjust itself to the new order of things," he said. "But the honeymoon is over. Within the last few weeks we have gone to bat on a dozen cases of non-compliance and still other cases are in the works."

Publications

Economic principles essential to employment expansion in the United States, and basic conflicts between a spending policy and a program of saving and investment in productive enterprise, are discussed in a book just published by the Machinery and Allied Products Institute under the title, **"Capital Goods and the American Enterprise System."**

Budd Wheel Co. announces its **1939 Dual Wheel Catalog,** containing information on both single and dual wheels, their construction and application.*

Catalog 229 by the Hanna Engineering Works describes the Hanna line of **hydraulic cylinders.***

A 24-page catalog by the Link-Belt Co. describes its Peck **overlapping pivoted bucket carrier** for handling and elevating coal, stone, rock. etc.*

Lyon Metal Products. Inc.. describes and illustrates the use of **steel tool storage equipment** in a new catalog.*

The customer research staff of General Motors Corp. has published a booklet entitled **Motorist's Handbook and Buyer's Guide.***

Information on American **assembled type "Dustube" dust collectors** is available in a catalog by the American Foundry Equipment Co.*

Bulletin 10339 by the Torrington Manufacturing Co. gives dimensions, prices and performance curves of a new **one-piece three-bladed fan.***

An eight-page bulletin on M.S.A. **eye protection** has been published by the Mine Safety Appliance Co.*

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

Weekly Pay High For Auto Workers

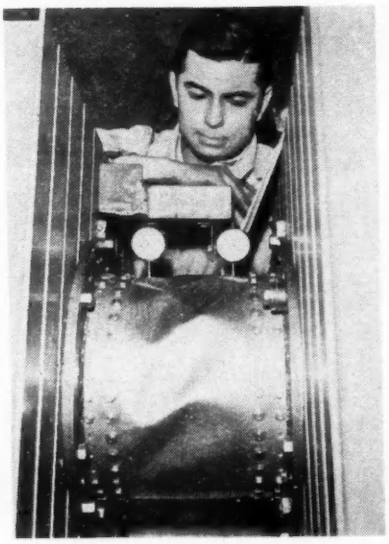
Weekly wages of factory workers in the automobile industry averaged $31.35 in January this year, compared with $25.15 in the same month of 1938, according to the Automobile Manufacturers Association.

Work hours per week averaged 34 at the start of this year, against 27½ last year. Hourly rates of pay remained high, being reported by the U. S. Bureau of Labor Statistics at 92½ cents, compared with an even 92 cents the year before.

Automobile industry workers' wages at present compare with an average for all manufacturing industries of $23.80 a week at a base rate of 65 cents an hour.

Martin Reports Quarter Profit

The first quarter report of the Glenn L. Martin Co. shows net sales for the period of $3,540,511.10 and a net profit of $682,496.55 equal to 62½ cents per share. As of March 31, 1939, the company's backlog of unfilled orders was $39,137,738.07.



Materials Test

Tests sponsored by the Civil Aeronautics Authority are now being carried out at the Guggenheim Aeronautics Laboratory at the California Institute of Technology, to analyze strength properties of materials used in aircraft construction. Here a metal cylinder, made of aluminum alloy sheets, is watched by an engineer as it buckles under pressure. Tests are made for bending, torsion and load.

Advertising

Fisk Tire Co.'s discussion of a change in trademark design brought vigorous protests from dealers throughout the country, according to H. R. Hurd, advertising manager. The little boy with a candle was to be given a smile instead of a yawn, and the old-fashioned sleeping suit was to give way to a pair of pajamas. The 25-year-old trademark was conceived and drawn by Burr Giffen, New York, and has been the focal point of millions of dollars worth of advertising in magazines, newspapers, trade papers, and dealer helps. Critchfield & Co., Chicago, is the agency.

Carrier Corp., Syracuse, has announced expansion of its 1939 advertising appropriation. Charles Dallas Reach, Newark, is the agency.

John F. Saunders, formerly with Batten, Barton, Durstine & Osborn, Inc., has joined Paris & Peart as account executive.

G. William Anderson, formerly president of Anderson & Joy, Inc., has been appointed an account executive and director of merchandising for Dillingham, Livermore & Durham, Inc.

New Tire known as the Royal Master De Luxe will be introduced in 1939 advertising for the Dominion Rubber Co., Ltd., Montreal. MacLaren Advertising Co. will direct the campaign. Newspapers, national magazines, posters and radio will be used.

Announced this week by Botsford, Constantine & Gardner, advertising agency, is the appointment of Hugh D. McKenzie as account executive in charge of advertising and publicity for California division of the Gilmore Oil Co. He assumes the responsibilities formerly held by Donald R. Dawson.

According trade reports in San Francisco, farm implement and tractor companies are going air minded throughout the western sections of Canada. Radio stations report the biggest bookings in history from tractor firms. The fact that these companies are spending heavy advertising money for the first time in approximately nine years indicates Western Canadian business is showing some improvement.

Crediting newspaper advertising with an important part in Nash's 61 per cent sales gain during the first quarter, W. A. Blees, general sales manager, announced that the company plans a 70 per cent increase in its newspaper lineage for April and May.

General Motors' Parade of Progress Exposition, now in its fourth year of continuous operation, reports it passed the 6,000,000 mark in attendance on April 3. The showing on that date was in Knoxville, Tenn.

Calendar

Conventions and Meetings

National Automobile Dealers Association Annual Meeting, San Francisco .....April 17-20
Chamber of Commerce of the United States, Annual Meeting, Washington, D. C. .....May 2-4
American Roadbuilders Association, Annual Meeting, San Francisco, May 7-10
The National Battery Manufacturers Association, Spring Convention, The Greenbrier Hotel, White Sulphur Springs, West Virginia May 11-12
American Foundrymen's Association, Forty-third Annual Convention, Cincinnati .....May 15-18
SAE World Automotive Engineering Congress .....May 22-June 8
National Metal Trades Association, Annual Meeting, Chicago....May 24-25
American Iron & Steel Institute, Annual Meeting, New York City..May 25
American Society for Testing Materials, Annual Meeting, Atlantic City .....June 26-30
Automotive Engine Rebuilders Association, Seventeenth Annual Convention, Baltimore, Md. .....July 5-7
National Petroleum Association, Annual Meeting, Atlantic City, Sept. 14-15
American Welding Society, Annual Meeting, Chicago .....Oct. 22-27
American Trucking Association, Annual Meeting, Chicago .....Oct. 23-24
American Petroleum Institute, Annual Meeting, Chicago .....Nov. 13-17
National Independent Traffic League, Annual Meeting, Chicago....Nov. 23-24

Shows at Home and Abroad

Great Britain, London, Automobile Show .....Oct. 12-21
Italy, Milan, Automobile Salon, Oct. 25 to Nov. 11
International Automobile, Motorcycle and Motor Boat Show, Budapest, Oct. 27 to Nov. 6
Great Britain, London, Commercial Automobile Transportation Show, Nov. 2-11
Great Britain, Glasgow, Scotch Automobile Show .....Nov. 10-18

UAW Independent-CIO Factions Wrangle for Legal Recognition

Both Sections Charge Fraudulent Ballots "Planted" in Recent Election

The tangled affairs of the United Automobile Workers Union returned to the courts in Detroit during the past week as the rival CIO and independent factions jockeyed for position in their efforts to speak for the rank and file automobile workers.

Newly-elected officers of Dodge Local No. 3 were ordered to show cause on April 15 why they should not be enjoined from taking over their duties in a circuit court action brought by Oliver D. Hamel, a Homer Martin independent, who was defeated in the election for financial secretary. The request for an injunction charged that thousands of fraudulent ballots had been cast in the election in which he met defeat. The CIO faction has countered with the charge that the fraudulent ballots were planted by its opposition in an attempt to discredit the election.

The CIO contingent has also filed in the circuit court an amended bill in its petition for a suit to determine which faction is lawfully entitled to recognition as the official UAW. The amended bill asks the court to recognize the recent actions of the Cleveland convention and to declare the actions of the preceding Martin independent convention null and void.

Following instructions received at the Cleveland convention, where he was elected president, R. J. Thomas, the CIO-UAW leader, has requested a conference with representatives of the Ford Motor Co., a committee of Ford workers, the Ford Organizing Committee and a representative of the CIO for the discussion of matters involving establishment of a labor relations agreement. The request asked that such a conference be arranged as soon as possible.

In his latest radio broadcast, Homer Martin, independent leader, has pointed to the 13 to 5 left-wing majority on the executive board of the CIO faction as verification of his charges that his opposition is dominated by the Communist party. He also charged that his opposition has spent around $400,000 since January in furtherance of its program of which $300,000 was borrowed from the CIO. He announced further that his union is considering the establishment of a basis upon which the membership can vote on the question of affiliation with the American Federation of Labor, but repeated that such a decision could be made only by vote of the membership and that affiliation would be considered only the basis of continued autonomy and independence for the UAW.

Expect Increased Imports in Greece

An increase in the imports of American automobile engines and cylinder blocks into Greece is believed likely to result from the liberalization of the import restriction on these goods, the American commercial attache at Athens has reported to the Department of Commerce. The Ministry of National Economy of Greece has ruled that import permits for automobile engines and cylinder blocks may be issued without limit as to value if the goods are to be used for replacements.

It was said to be expected that there will be a large demand for these American products in view of the restrictions on imports of new automobiles into Greece.

Revive Boeing-TWA Contract Discussion

In a statement to stockholders by C. L. Egtvedt, president of Boeing Airplane Co., it is reported that negotiations are under way between the company and T.W.A. for settlement of the contract cancellation of last fall. The settlement, if successful, would involve a purchase by T.W.A. of an undetermined number of Stratoliners, the report indicated.

Boeing has held a $397,500 deposit on the T.W.A. order as security against possible damages, this amount appearing on the company's year end balance sheet as a current liability.

The year end audit shows a net loss of $554,958 after provisions of $488,068 for reserve for flying boats inventory, engineering, research expenses and income taxes. In the year preceding, 1937, net profit was $311,683, equal to 51 cents a share, par value $5.

General Motors March Car Sales

March sales of General Motors cars and trucks from all sources of manufacture totaled 182,652 compared with 109,555 in March, 1937, according to a report issued by the corporation. Sales in February were 153,886. Sales for the first three months of 1939 totaled 469,284 compared with 298,271 for the same three months of 1938.

Sales to dealers in the United States totaled 142,743 in March compared with 76,142 in March a year ago. Sales in February were 115,890. Sales for the first three months of 1939 totaled 377,597 compared with 196,851 for the same three months of 1938.

Burgess Specializes

The Burgess Battery Co., Acoustic division, has withdrawn from the manufacture of some automotive products. The tools, dies and equipment necessary to fabricate the various parts which the company formerly furnished the trade have been disposed of to several different organizations.

Withdrawal from the production of automotive materials, the company states, has been done to permit concentration on the production of intake and exhaust quieting devices, for application on Diesel and large gasoline engines.

AUTOMOTIVE INDUSTRIES

Summary of Automotive Production Activity
(Week Ending April 15)

BUSES Industry appears to be maintaining its present level. Some interest centers about inquiries for small units in East.

TRUCKS One large producer reports business registering gradual but steady increase. Output considered "healthy" with most producers holding production steady at present.

TRACTORS Production leveled off at "fair" rate. General opinion seems to be that farmers are not certain as to purchasing power in immediate future. Increased buying would mean stepped-up schedules, for dealer stocks are reported fairly low.

AUTOMOBILES Slight decline from last week with AUTOMOTIVE INDUSTRIES' mid-week survey estimating output at 83,000 cars. April total should be slightly more than 335,000 units. First quarter, based on AMA estimate, should show 1,055,787 units—a gain of 58% over the first quarter of 1938.

MARINE ENGINES One producer reports increased output in both large and small types. Small single-cylinder engines, announced at New York show, reported meeting with good response.

AIRCRAFT ENGINES New orders have increased the backlog in the two large engine plants. Several smaller factories report business outlook is brighter than ever.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

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Car Dealer Representation by States and by Population Groups*

(As of January, 1939)

Population Divisions

STATE	0-1,000	1,000-2,500	2,500-5,000	5,000-10,000	10,000-25,000	25,000-50,000	50,000-100,000	Over 100,000	Total Dealer Representations	Exclusive Dealer Representations	Combined Dealer Representations
Alabama	53	118	90	44	103	...	32	32	472	210	262
Arizona	27	50	59	53	...	40	...	...	229	77	152
Arkansas	90	105	148	70	60	15	15	...	503	253	250
California	399	500	468	506	404	190	150	393	3,010	1,010	2,000
Colorado	126	138	79	105	67	18	18	61	612	277	335
Connecticut	90	126	104	118	204	100	43	89	874	306	568
Delaware	18	27	30	...	...	...	...	24	99	33	66
District of Columbia	...	...	...	...	...	...	...	135	135	47	88
Florida	50	127	151	150	94	79	...	93	744	258	486
Georgia	68	174	117	108	104	15	52	38	676	337	339
Idaho	113	101	131	71	38	...	...	...	454	185	269
Illinois	582	586	412	479	375	249	138	471	3,272	1,332	1,940
Indiana	290	325	250	272	237	133	55	176	1,738	738	1,000
Iowa	687	525	385	154	154	94	68	37	2,104	957	1,147
Kansas	422	352	220	142	183	12	19	54	1,404	658	746
Kentucky	221	237	166	118	70	70	20	60	962	375	587
Louisiana	60	98	103	77	51	30	20	34	473	229	244
Maine	78	99	117	103	72	35	22	...	526	280	246
Maryland	215	111	88	20	47	36	...	131	648	255	393
Massachusetts	69	119	184	268	414	206	121	336	1,717	719	998
Michigan	546	550	279	291	278	117	160	294	2,515	1,034	1,481
Minnesota	756	459	272	175	172	...	...	197	2,031	944	1,087
Mississippi	90	123	94	38	115	30	...	...	490	218	272
Missouri	289	334	187	170	118	19	34	193	1,344	648	696
Montana	211	140	47	79	60	28	...	...	565	233	332
Nebraska	383	315	120	99	65	...	26	49	1,057	490	567
Nevada	51	70	34	13	20	...	...	...	188	65	123
New Hampshire	58	78	63	18	81	34	22	...	354	171	183
New Jersey	135	174	153	288	345	145	97	165	1,502	606	896
New Mexico	39	48	63	43	24	24	...	...	241	90	151
New York	769	741	572	373	693	184	142	742	4,216	1,605	2,611
North Carolina	122	222	146	155	160	45	95	...	945	423	522
North Dakota	404	144	12	65	48	18	...	...	691	381	310
Ohio	643	556	398	433	379	228	58	508	3,203	1,352	1,851
Oklahoma	150	282	181	194	147	33	...	58	1,045	508	537
Oregon	157	130	107	125	74	22	...	47	662	248	414
Pennsylvania	924	619	753	679	626	170	227	427	4,625	1,742	2,883
Rhode Island	17	30	15	10	32	54	18	62	238	93	145
South Ca olina	46	99	90	85	60	35	40	...	455	220	235
South Dakota	239	175	63	11	71	21	...	...	580	294	286
Tennessee	87	104	149	122	33	16	...	109	620	249	371
Texas	479	757	491	428	254	74	97	174	2,754	1,001	1,753
Utah	59	73	64	29	18	15	...	24	282	120	162
Vermont	68	92	35	67	53	...	...	...	315	124	191
Virginia	354	187	104	83	96	76	18	58	976	441	535
Washington	272	228	174	39	151	30	...	129	1,023	419	604
West Virginia	146	174	70	125	78	38	79	...	710	287	423
Wisconsin	897	495	329	229	168	169	66	125	2,478	885	1,593
Wyoming	75	115	26	46	27	...	...	...	289	99	190
Total	12,124	11,412	8,393	7,370	7,323	2,947	1,952	5,525	57,046	23,526	33,520

*Chilton Trade List count

1938 Aeronautic Exports Up 73 Per Cent*

Year	Aircraft	Aircraft Engines	Parts and Accessories†	Total
1926	$303,149	$573,732	$150,329	$1,027,210
1927	848,568	484,875	570,117	1,903,560
1928	1,759,653	664,826	1,240,244	3,664,723
1929	5,484,600	1,383,197	2,257,548	9,125,345
1930	4,819,669	1,634,985	2,363,456	8,818,110
1931	1,812,809	1,432,229	1,622,849	4,867,687
1932	4,358,967	1,831,145	1,756,421	7,946,533
1933	$5,389,739	$1,518,309	$2,247,834	$9,155,882
1934	8,258,484	4,383,101	4,906,596	17,548,181
1935	6,638,515	2,459,317	5,233,011	14,330,843
1936	11,299,451	5,397,469	6,358,841	23,055,761
1937	21,076,170	5,944,004	12,363,229	39,392,403
1938	37,977,924	7,899,844	22,331,282	68,209,050

* Automotive-Aeronautics Trade Division, Bureau of Foreign and Domestic Commerce. † Includes parachutes.

U. S. Exports of Parts and Accessories—1938*

COUNTRIES	Auto Parts for Assembly	Auto Pistons	Auto Piston Rings	Auto Differential and Transmission Gears	Spark Plugs	Auto and Truck Springs	Asbestos Brake Lining: Molded and Semi-Molded	Asbestos Brake Lining: Not Molded	Auto Parts for Replacement N. E. S.	Auto Accessories N. E. S.	Total Exports of Parts and Accessories
Europe	$11,885,772	$73,153	$140,590	$171,737	$721,153	$31,935	$134,587	$38,063	$12,176,243	$6,026,684	$28,316,768
North America	20,564,709	142,828	346,029	112,246	170,342	101,819	189,894	72,202	5,252,442	2,418,564	31,011,580
South America	9,481,418	52,306	50,375	33,838	115,296	141,716	149,741	38,298	6,530,072	221,884	19,017,490
Asia	3,899,563	23,949	24,375	56,633	128,589	209,944	58,009	15,130	7,181,832	201,834	12,871,703
Oceania	388,089	539	10,344	8,291	22,790	2,677	18,518	7,994	1,513,900	178,307	2,176,564
Africa	219,011	26,290	27,643	7,613	36,630	129,135	58,221	5,078	4,090,721	220,504	4,865,947
Total	$46,438,562	$319,065	$599,356	$390,358	$1,194,800	$617,226	$608,970	$176,765	$36,745,210	$3,843,757	$98,260,052
Alaska	...	...	...	...	...	...	...	...	...	...	209,206
Hawaii	30,772	3,632	11,181	5,699	29,723	28,158	27,278	5,828	685,572	70,836	920,592
Puerto Rico	3,157	9	1,276	2,019	10,018	36,528	12,950	3,070	337,246	10,283	429,006
Virgin Islands	585	...	34	...	450	159	50	...	10,119	477	12,902
Grand Total	$46,473,076	$322,706	$611,847	$398,076	$1,234,991	$682,071	$649,248	$185,663	$37,778,147	$3,925,353	$99,831,758

* Automotive Division, Bureau of Foreign and Domestic Commerce.

THE CHILTON ROUND TABLE

In order to give readers of AUTOMOTIVE INDUSTRIES a clue to certain merchandising and service aspects of the automotive industry which are normally outside the scope of an industrial publication, we present herewith excerpts from the April issues of the four other magazines published by the Automotive Division of the Chilton Co.

FROM AUTOMOBILE TRADE JOURNAL

Dun & Bradstreet's preliminary report of retail sales in sixteen trades showed some loss in sales for all trades in 1938 *compared with* 1937. *Individual results varied widely and sales for motor vehicle dealers reporting showed a decline of* 25 *per cent in* 1938 *over the previous year. Small comfort is this, for dealers suffered greater sales loss than any of the other fifteen retail trades reporting.*

Since gasoline consumption in gallons held even with 1937, *it seems likely that service once again was the real source of dealer profits.*

FROM COMMERCIAL CAR JOURNAL

Germany has solved the problem of truck rating in characteristic totalitarian fashion. Beginning Jan. 1, 1940, *the existing* 15 *load ratings for motor trucks will be liquidated as was Czecho-Slovakia and registering authorities will recognize only four. The only ratings that will be recognized for registration will be* 1½, 3, 4½ *and* 6½ *tons. The so-called commercial type will be allowed only in one type.*

We cannot help remarking how this differs from current thinking here. In the United States both those who use the trucks and those who sell them agree that maximum economy can be attained only by fitting the truck to the job, and that means an indefinite number of fits because of the variety of jobs to be performed.

FROM MOTOR WORLD WHOLESALE

One of the most popular regular monthly features of Motor World Wholesale *is the list of* 20 *most active jobbing lines carried on the*

(Turn to page 507, please)

Metallic

By JOSEPH GESCHELIN

PIONEER work of leading piston ring manufacturers has brought to light an interesting technique for reducing wear in parts subject to severe scuffing and abrasion during the initial break-in period. Paralleling this development is the use of somewhat similar treatment to provide corrosion-resistance and self-lubricating properties.

Most engineers and production men are familiar with the proprietary surface coatings on piston rings which have yielded a veritable harvest of results in prolonging the life of cylinder bores and pistons, decreasing blow-by, increasing oil economy. The coating of rings, while of recent origin, is practiced so widely and has been the subject of such extensive treatment in current literature that we shall make but passing reference to that phase of the subject.

The coatings to which we shall refer, fall into two general categories —metallic and chemical. It is of more than passing interest to note that a general appreciation of such coatings dates from the introduction of coated rings as standard equipment by most motor car manufacturers. Nevertheless, even in this extraordinarily brief period, these surface coatings have gained unusual favor and bid fair to broaden the scope of application.

It is fitting to say right at this point that research into the unique properties and/or limitations of wear-resisting coatings is going on in many directions since the art is young and many characteristics have yet to be explored. Fact of the matter is that one of the prominent investigators in this field cautions that such coatings must not be considered as a panacea for all ills, emphasizing that coatings cannot take the place of sound design.

Coincident with these developments is an appreciation of the role of self-lubricating properties as an aid in combatting wear and scuffing in the surfaces thus treated. It is claimed that one of the most effective treatments to this end is the use of colloidal graphite which is carried into the granular structure of the coating by dipping in a light oil bath.

In the category of commercially available protective treatments which may be employed where best suited, we can list the following:

Parker Rust Proof, Bonderizing and Parkerizing chemical coating.

American Chemical Paint, "Thermoil-Granodine."

Ferrox, oxidizing surface treatment.

Standard Oil Co. of California, sulfidizing chemical coating having E-Z properties.

We also may include the basic coatings in use for many years, such

Research has brought to the front a new technique. The practice bids for a broad scope of application so here are some unique properties of

and Chemical Coatings

as the anodizing of aluminum pistons, tin-plating of aluminum and cast iron pistons, cadmium plating.

Interesting point about the coatings intended for wear-resistance is that, in the main, expected life of the coating is very brief, usually not much longer than the initial break-in period. Naturally, this period varies as to the number of hours or mileage, according to the application. However, regardless of its life, the coating unquestionably appears to perform its intended function of reducing or entirely banishing initial wear, improving life of the wearing surfaces for the duration of their useful service period.

Consider now some examples of current practice which, in our opinion, not only are indicative of the scope of application but may direct the thinking of engineers and production men to other uses where corrosion-resistance, self-lubricating properties, and intial break-in wear and scuffing control are problems of major consideration.

The following list gives the names of Buick parts treated with Parker Bonderite and colloidal graphite, principally for the purpose of resisting corrosion and providing self-lubricating properties, although several of the parts also provide resistance to wear.

Torque ball mounting stud
Clutch release rod adjusting nut assembly
Clutch retainer lever spring pin
Clutch retainer lever spacer pin
O.P. Idler gear pins
Second speed gear thrust washer
Clutch retainer lever assembly
Clutch yoke ball stud
Clutch release lever pivot screw

The process used in applying the protective Bonderite coating at Buick is as follows:

1. Clean — Degreaser or alkaline wash.
2. Hot water rinse.
3. Process in Bonderite "D".
4. Hot water rinse.
5. Air dry.
6. Immerse in graphited soluble oil solution.
7. Air dry.

According to a report from the Parker Rust-Proof Co., the combination of Bonderite and colloidal graphite surface treatment described above, is in use by others for the treatment of piston rings, clutch levers, clutch drive plates, camshafts, valve shafts, push rods, valve guides, axle shafts, ring gears and pinions, thrust washers and spacers. The Parker engineering department also recommends this treatment for improving the bearing quality of any steel.

In addition to the parts listed above, Buick uses two makes of surface treated rings—Ferrox rings supplied by Perfect Circle and Granoseal-treated rings supplied by Sealed Power.

Carl T. Doman, V.-P., Air Cooled Motors Corp., tells us that for some time they have been treating the camshafts of the 4AC-150 aircraft engines with the Bonderite process. This has resulted in the complete elimination of the original difficulty of undue wear on the cam nose during initial break-in.

More recently, the hydraulic valve lifters for the same engine have been Granodized (A.C.P. process) with a consequent improvement in life of both lifters and camshaft.

As a result of the excellent service history of parts treated with Bonderite, Air Cooled Motors now are conducting experiments with this treatment for a variety of other

Automotive 26 Materials

parts where resistance to wear is essential. To this end they are experimenting on valve stems, valve guides, piston pins, and cylinder liners for the aircraft engine. On the 4CHO-150 truck engines they expect to Bonderize the cast iron pistons. Ferrox-treated Perfect Circle rings are used as standard equipment on both engines.

American Chemical Paint Co., has made remarkable progress in automotive applications with its "Thermoil-Granodine" process. It is said to have been successfully applied to piston rings, pistons, valve tappets, axles, gears, camshafts, screws, parts of carburetors, etc. It creates the surface found on the well-known Granoseal piston rings. It is equally easy to apply in small- and large-scale production.

At its boiling temperature, Thermoil-Granodine reacts with the metal and transforms its surface into a layer of iron and manganese phosphates integrated with the metal beneath. This peculiar coating, when oiled and used as a bearing surface, quickly becomes so smoothly burnished that friction is reduced to such an extent that scuffing and tearing of the metal are eliminated.

When the iron or steel parts are to be treated with Thermoil-Granodine, they must be first cleaned, using a spirit solvent, or solvent vapor, or an alkaline solution followed by a water rinse. This treatment prepares the parts for immersion in the boiling chemical solution. Here they remain for a time varying from ten minutes to an hour.

After the chemical bath, the parts are rinsed in hot water, and then dried. If desired, the further protection of a thin oil-film may be provided by dipping the parts into oil, or into an emulsion of a "soluble" oil.

The A.C.P. process is currently used for treating the camshafts of a large number of large production engines, including passenger car and truck engines. It is in use for coating valve tappets and lifters; and on a variety of other parts where wear-resistance or corrosion resistance are desired.

Typical of the camshaft treatment is the new installation for the engine of The Champion, recently announced by Studebaker. The A.C.P. coating is applied rapidly in a simple piece of equipment comprising five immersion tanks having the following cycle of events:

1. Electrolytic clean (alkaline bath)
2. Hot water rinse
3. Granodine chemical bath, held at 190-200 deg. F.
4. Hot water rinse
5. Dip in soluble oil, serving as rust preventive

Hudson is another prominent motor car manufacturer who has adopted the Thermoil-Granodizing process for treating the cam surfaces of camshafts. According to the company, this process is used to eliminate the harmful effects of the break-in period. The treatment produces a self-lubricating effect said to add greatly to the life of the camshaft.

Unique application of the A.C.P. coating is found at Graham-Paige where the sides of the lower end of connecting rods are treated to prevent scuffing during the initial run-in period. According to G-P engineers, the coating when subjected to fricton, burnishes quickly and thereafter reduces wear to a remarkable degree. The new coating takes the place of the copper-plating formerly used for the same purpose.

Cadillac uses hydraulic lash adjuster cylinders and tappet bodies with Ferrox surface treatment. In addition, Cadillac uses Ferrox-treated Perfect Circle rings.

Now a word concerning the role of colloidal graphite as an adjunct

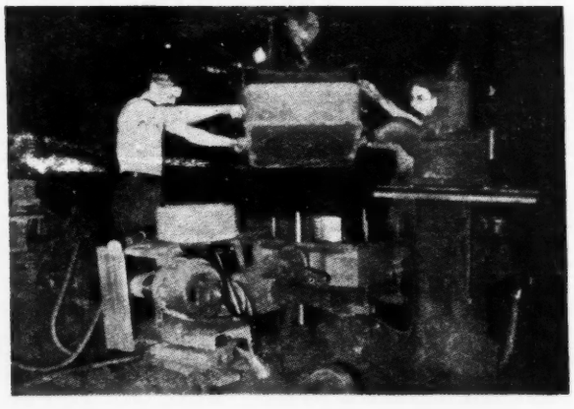
Automotive Materials

Water Repellent for Seat Covers

For the past few years "Aridex" water repellent, product of E. I. du Pont de Nemours & Co., has been applied to many automobile seat covers made from textile fabrics. More recently the Wortendyke Mfg. Co., Richmond, Va., adopted "Aridex" for its Flexine paper fiber fabrics, used for the same purpose. Besides giving them the advantages of water repellency and spot and stain resistance, the du Pont product is said to make easier the handling during manufacture. These fabrics are converted into automobile seat covers by the Crawford Mfg. Co., of Richmond, Kansas City, and Dallas.

Spots and stains are easily removed from these paper fabric seat covers by sponging or wiping. The fabrics do not wet through readily, and, if wet by pressure or a heavy storm, dry out in a fraction of the time required by untreated fabrics.

It is claimed that "Aridex" does not coat or seal the fabric. The repellent finish forms an invisible



New manufacturing equipment was developed to mold ribs on truck trailer brake drums made of Meehanite cast iron described on page 506. The photograph shows the cope and drag equipment, together with the power-driven slick which is also a Meehanite casting

to the surface coatings on rings, pistons, valve guides, rocker arm supports, etc. According to a statement by the Acheson Colloids Corp., the chief advantages in using colloidal graphite for this purpose are as follows:

1. Satisfactory dry lubricant in place ready to function on initial movement.
2. An agent which sets up resistance to oxidation by virtue of being impregnated in the pores adjacent to the non-oxidized metal immediately below the coating.
3. Lubricating properties which increase the life of the porous coating by reducing the friction which otherwise exists.
4. Combined treatment has the ability to hold an appreciable amount of oil. The graphite is held in place by the pores and in turn it is capable of holding a film of oil from two to four times the thickness of a film of oil held by untreated metal.

So far as the future use of this treatment is concerned, there is evidence that colloidal graphite may be applied not only in treating the parts that go into the mechanism but also in the treatment of the equipment and tools used in producing automotive parts of various kinds.

To round out this discussion we give below the trade names and descriptions of the coatings used by some of the leading piston ring manufacturers:

"ALTINIZING"—electrolytic deposition of a tin-base alloy on rings by McQuay-Norris.

"FERROX"—not strictly a surface coating, but a change in the structure of the surface metal by treatment in an electric surface at temperatures approximating 1,000 deg. F., depending upon the material. This process was developed by Perfect Circle for piston rings, adaptation of the process being expedited by licensing its use for other applications.

"SILCOAT"—an outgrowth of the black iron-oxide coating which results from the Heat-Shaping process by which tension is imparted to Pedrick piston rings. "Silcoat" is a still further conversion, by chemical process, of this black iron-oxide surface into a coating of silicon and carbon, said to be many times more effective in resisting wear than the oxide coating. It is applicable, however, only where parts have been subjected first to a heat treatment which brings the iron-oxide to the surface.

"FERITEX"—a chemical sulfidizing procedure which imparts E-P characteristics to the contact surfaces has been adopted by American Hammered Piston Ring Div., Koppers Co. The process is licensed for use by the Standard Oil Co. of California.

"GRAFOTOX"—a special Bonderized coating with Acheson colloidal graphite treatment, which is used by the American Hammered Piston Ring Division of The Koppers Company. It is of interest to note that this producer uses both Feritex and Grafotox processes.

"GRANOSEAL"—a phosphatic surface treatment characteristic of Sealed Power piston rings.

"GRAPHITOX" — special Bonderite coating with Acheson colloidal graphite treatment is featured on rings made by Muskegon Piston Ring Co.

Finally, we may say that many manufacturers in the automotive industry are giving serious consideration to the adoption of surface coatings for wear-resistance and/or corrosion-resistance. In fact, during the course of this brief investigation, we contacted a number of organizations where experimental work to this end is in progress. It seems evident that the new technique will find still wider application during the course of the next few months.

NEW DEVELOPMENTS

film on the individual fibers, thus the pores of the fabric are not clogged and the free circulation of air is permitted. The finish makes Flexine fabrics smooth, more comfortable, and is said to nearly double their durability.

New Solvent for "Piston Varnish"

Discovery of an aromatic solvent compound which is said to quickly dissolve "piston varnish" has been announced by the chemical department of the Curran Corp., Malden, Mass. The new solvent is vaporizable at combustion temperatures and the saturated vapor, upon cooling and reaching the dew point, precipitates copious quantities of the hot tar solvent. Dissolved "piston varnish" and/or carbonaceous tars may be removed from the engine by draining the engine oil. According to the manufacturer, a normal dose of 32 ounces should be administered just before oil change time, then any residual film or deposits will be re-

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Resists Abrasion

Discussing the high abrasion resistance of magnesium alloys, Leslie Brown of Magnesium Fabricators Division of Bohn Aluminum & Brass Corp., told recently of the experience of one prominent motor car company which uses magnesium alloys for its crankcase core box.

"From one of these core boxes," he said, "they have taken over 2,400,000 cores. This record is all the more remarkable because all of these cores are blown under an air pressure of from 100 to 125 lb. Thus, although there is literally a sand blasting action on the core box, the material is apparently impervious to wear."

Malleableizing

By W. F. Ross*

INITIATED by a few of the larger producers of castings for the automotive and machine production industry, the trend toward furnace equipment designed to decrease annealing time to a minimum has steadily asserted itself. At the present time malleableizing cycles of over 55 hours are becoming rare and increasingly costly in relation to the newer methods of production in this highly competitive field.

Based on production methods of a decade ago, charges, packed in scale or ore filled pots and covered, were placed on stools in box-type kilns and heated to from 1550 deg. Fahr. to 1650 deg. Fahr. in approximately 30 to 40 hours. This heating-up period was followed by a soaking period of from 50 to 65 hours, after which cooling to about 1200 deg. Fahr. for a period of 80 to 90 hours in the kiln permitted the opening of the kiln for relatively fast cooling to 500 deg. Fahr. or 600 deg. Fahr. prior to removing and unpacking the charges. The total cycle was, therefore, from 175 to 225 hours, assuming 5 to 10 hours total handling time.

The castings produced by this cycle were uniformly satisfactory in regard to machining qualities, elongation (18 per cent to 20 per cent), and tensile strength (50,000 lb. per sq. in. or better). The retention of these characteristics, plus the beneficial advantages of a relatively short malleableizing cycle, constitutes a metallurgical problem which may briefly be analyzed as follows:

The speed of graphitization during the heating-up and soaking periods is in direct relation to the temperature employed. Therefore, the cycle may be materially shortened during this phase of the annealing cycle by employing temperatures somewhat higher than the 1550 deg. Fahr. referred to above. At the higher temperature, however, excessive grain growth or overannealing must be prevented by dropping the temperature of the charge rapidly to a semi-critical temperature, or about 1400 deg. Fahr., a condition manifestly impossible to effect in the kiln or batch type annealing equipment unless the entire charge is withdrawn from the heating chamber.

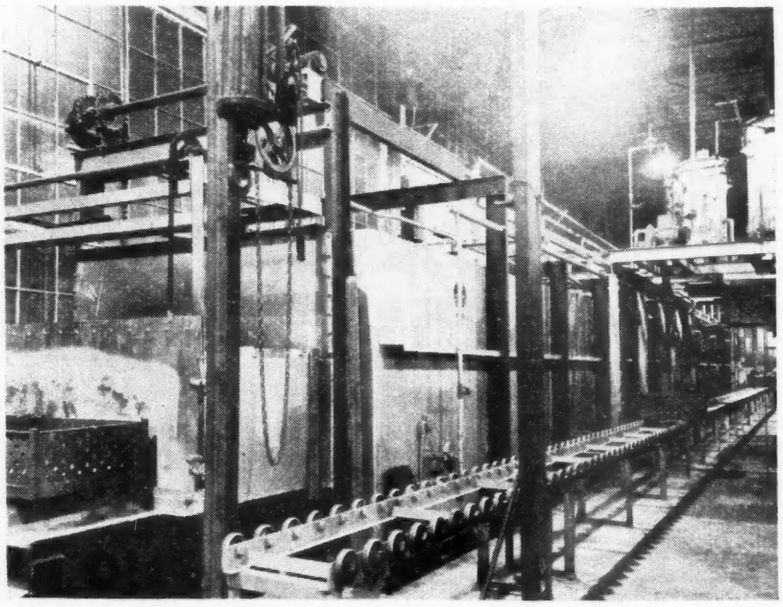
From 1400 deg. Fahr. precipitation of temper carbon is continued by cooling slowly to about 1300 deg. Fahr. before withdrawing the material from the heat. The various steps, including the fast and slow cooling, would indicate the practical utilization of a furnace equipment of continuous type for malleableizing.

The elements necessary to design a continuous malleableizing furnace, with suitable provision for all factors influencing the actual time interval, resolve into an equipment broadly described as a continuous conveyor type equipment, suitably divided into separately controlled heating, fast cooling and slow cooling zones, designed with provision for controlled atmosphere to eliminate the scaling of castings by oxidation, thus materially reducing the tare weight of supports, containers and packing.

The application of special atmosphere to malleableizing constitutes a major factor in the development of short cycle work. A continuous furnace adapted to the now obsolete malleableizing cycles and arranged to anneal work packed in pots would not only reach inconceivable proportions, but would certainly be grossly inefficient and costly.

The elimination of all tare weight except for relatively light conveying trays or boxes may, therefore, be attributed to the utilization of non-oxidizing atmosphere, which surrounds the work while subjected to all temperatures within the oxidizing range and thus prevents the formation of scale.

Any furnace equipment to be used in conjunction with a special protective atmosphere must be arranged for effective sealing by means of welded joints in the enclosing shell, and charging and discharge opening



This illustration shows the discharge end of a 340 kw., roller rail hearth, conveyor type malleableizing furnace. The special atmosphere generating equipment is mounted over the aisle

* Furnace engineer, The Electric Furnace Co.

on Short Cycles

Annealing period reduced to impressive minimum with modern equipment

of the lock chamber, vestibule, or similar type.

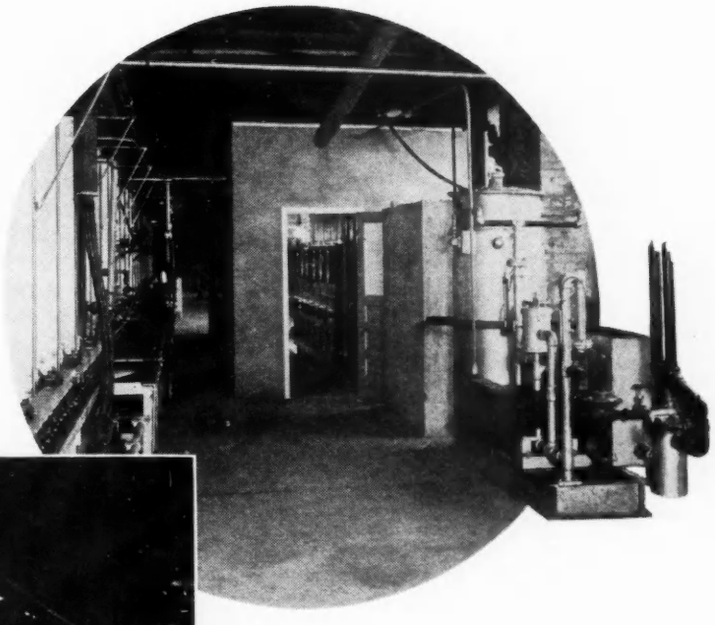
The least expensive special atmosphere for use in continuous furnace work is probably that produced by the combustion of ordinary natural or manufactured gas mixed with combustion air and carefully controlled at constant ratios. The ratios of gas to air before combustion will control the ratio of carbon dioxide to carbon monoxide in the products of combustion.

Of the numerous cycles employed in present-day malleableizing with continuous equipment, those requiring from 30 to 50 hours are best illustrative of modern continuous equipment. Other cycles ranging as low as 12½ hours are used extensively with special analysis malleable castings, but the sequence of temperature steps in all these cycles is substantially similar.

The most interesting specially developed malleableizing furnaces of the continuous type have made use of the continuous pusher or of the roller hearth conveyor systems, either of which is adaptable to heating by means of electric power or fuel fired radiant tubes. Identical installations of the pusher type recently installed in the plant of a large Canadian producer afford an excellent basic picture of representative modern equipment.

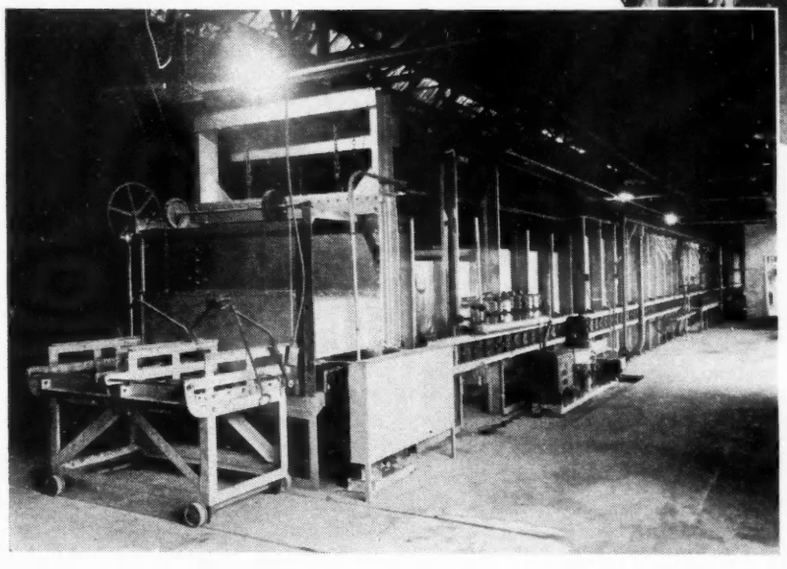
Pusher Type Roller Rail Annealing Equipment

Designed for a production of 833 net lb. per hr. from each of two furnaces, the equipment consists of a hydraulic pusher operated roller rail conveyor extending the length of the furnace and cooling chambers, which



Above is the special atmosphere equipment on the 860 kw., roller hearth malleableizing furnace. The Elfurno generator for producing the special atmosphere for scale-free malleableizing the castings is shown at the right. The switching and pyrometer equipment and other automatic temperature control equipment are shown in the control room at the rear

The illustration below shows the discharge end of the 860 kw. roller hearth malleableizing furnace equipment. The arrangement for dumping trays of finished material from the wheeled buggy adjacent to the lock chamber is clearly illustrated



is arranged in each equipment to accommodate two rows of material loaded in box type trays of heat-resisting alloy construction.

Based on simultaneously charging two loaded trays per furnace, weighing approximately 211 lb. per tray and each loaded with an average of 440 net lb. of castings, the above rate of production is accomplished with a total time cycle of approximately 36 hours in the furnace. The material is quickly heated to 1500 deg. Fahr., then slowly heated to 1700 deg. Fahr. and allowed to soak 10 or more hours. The metal is then quickly cooled to 1400 deg. Fahr., slowly cooled to 1300 deg. Fahr. and discharged.

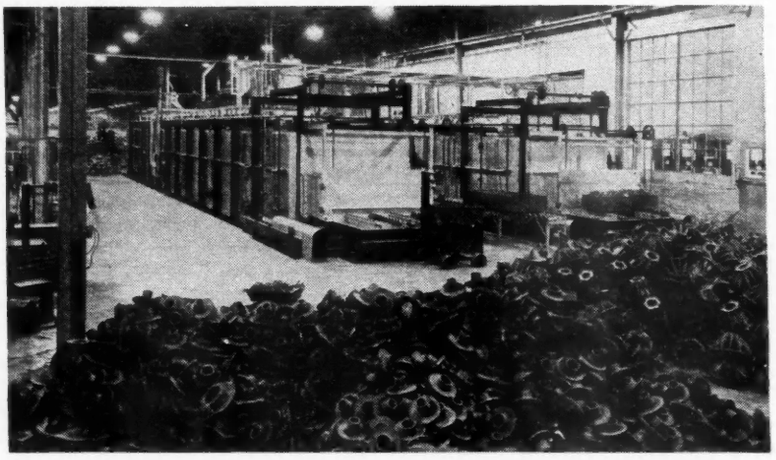
In the above cycle the time interval between charges amounts to approximately 63¼ min.

In operation, two loaded trays are placed on a charging extension adjacent to a close fitting plate type door, which seals a charging vestibule. The operator opens this door, moves the trays forward into the charging vestibule adjacent to the charging door of the furnace chamber proper, and recloses the outer or vestibule door. The door at the discharge end of the furnace equipment is then opened and two finished trays of material withdrawn from the discharge vestibule on to an unloading extension.

At the proper time the inner or chamber door at the charging end of the equipment opens, and the hydraulic pusher moves the two loaded trays previously placed in the charging vestibule forward into the heating chamber, where the trays become part of the continuous lines extending through the equipment. Each line is moved one tray length forward with succeeding pushes. When the forward push is complete, the pusher retracts, the charging door closes and the operator prepares for a succeeding charge as described above.

After introduction to the furnace chamber, the material moves at intervals through the heating chamber which is approximately 40 ft. in length and through the fast cooling section, where heat is rapidly withdrawn from the work by means of air ducts passing over and under the work.

The last phase of the cycle occurs in the slow cooling section which measures approximately 27 ft. in length, where the required cooling rate is maintained by automatic temperature control in conjunction with heating elements arranged to retard too fast cooling due to radiation from the chamber shell.



Shows the charging end of two identical 340 kw., pusher type, roller rail conveyor malleableizing furnaces. The application of the return conveyor for transporting empty containers from the discharge end to the charging end of the equipment is illustrated

As trays of finished material are withdrawn to the discharge extension, each tray is dumped and returned to the charging end of the equipment upon a gravity conveyor. The handling of trays at the ends of the equipment is facilitated by suitable buggy or track cars provided with roller rails on the same level as those which form the furnace conveying hearth.

The furnace and cooling chambers are entirely enclosed in a welded steel shell made gas-tight to permit the use of controlled atmosphere and suitably lined with insulating refractories according to the requirements of each of the individual chambers.

Heat to the work is supplied by means of heavy cast alloy grid type heating elements, suspended from the furnace arch in the heating-up section, and resting beneath the roller rails in the heating-up, soaking and slow cooling sections. In all, five separate and automatically controlled zones provide the heating steps necessary in the malleableizing cycle. One similarly controlled zone is placed between the soaking and slow cooling zones, arranged to accelerate or retard the fast cooling rate.

Although the equipment is arranged for electric heating, it is obvious that radiant tubes of the fuel fired type may be easily substituted for the grid type heating elements described. The choice of grid type heating elements or radiant tubes must necessarily lie in the comparative cost of gas and electricity at the location at which the contemplated equipment is to be installed.

Roller Hearth Type Continuous Equipment

The general operation of the roller hearth malleableizing equipment differs from that of the roller rail pusher type equipment, in that the material moves through the furnace chamber continuously at a uniform rate of speed.

Since trays of material being conveyed through the furnace equipment are not dependent for movement upon the preceding or succeeding tray, much lighter tray construction may be utilized than would be possible in a pusher type furnace, with the obvious advantage of a reduction in tare weight.

By equipping each roller with suitable gas-tight seals at the points where the roll passes through the furnace walls and shell, the roller hearth equipment is made adaptable to the use of controlled atmosphere for the prevention of scaling or oxidation upon the work.

A continuous roller hearth conveyor type malleableizing furnace equipment installed in the plant of a producer of castings for the automotive trade makes use of a special short cycle for the annealing of castings of somewhat different analysis than that used in regular malleable iron works. The major metallurgical difference lies in a reduction of the carbon content and an increase in the content of silicon, the proportional amounts depending upon the physical requirements of the short cycle castings. It is claimed that such short cycle castings show a slightly higher elongation (12 per cent to 18 per cent), with corre-

sponding tensile strengths ranging up to 62,000 lb. per sq. in.

The heating and cooling time for short cycle annealing in this particular installation is less than 13 hours. The material is quickly heated from cold to 1750 deg. Fahr., allowed to soak approximately 3 hours, cooled quickly to 1450 deg. Fahr. and then slowly cooled down to 1100 deg. Fahr. at which temperature it is discharged—the entire cycle requiring only 12 hours, 36 minutes.

The 860-kw. equipment consists of an electrically heated heating and soaking chamber, approximately 50 ft. long, adjacent to which is placed a rapid cooling section equipped with water cooled ducts. Successive cooling chambers, equipped with electric heating elements to retard the rate of cooling, and an end cooling chamber for final cooling complete the chamber portion of the furnace proper.

Gas-tight lock chambers at both ends of the equipment afford means of charging and discharging loaded trays of material with minimized loss of special atmosphere from the furnace chambers, and prevent air infiltration to the chambers.

Special atmosphere, with which the furnace chambers, the cooling chambers and the lock chambers at each end are continuously filled, is produced by a generator equipment utilizing the available combustible gas from the purchaser's line, which, when properly mixed with metered amounts of air and burned in a combustion chamber, afford products of combustion of an analysis suitable for the prevention of oxidation on work passing through the equipment. Before introduction to the furnace chambers, provision is made for the reduction of moisture in the products of combustion by means of cooling the gas in a surface type cooler.

The equipment is designed to accommodate suitable conveying trays of heat-resistant cast nickel-chromium alloy construction, measuring approximately 27 inches square and weighing approximately 100 lb. per tray. Two trays, each loaded with approximately 350 net lb. of material, are loaded and charged simultaneously at intervals of from 16½ to 18½ minutes, depending upon the type of material, the tray loading, etc. Based on a conservative loading of 350 lb. per tray, the equipment was designed to produce approximately 2500 net lb. of material per hour, utilizing the annealing cycle specified above. However, the actual equipment under test conditions produced as high as 2900 net pounds of material per hour.

In operation, two loaded trays of material are placed upon the loading extension at the charging end of the furnace equipment. The operator opens the door of the charging lock chamber and moves the trays forward into charging position adjacent to the charging door of the furnace chamber proper, after which the lock chamber door is closed and the chamber allowed to purge.

In the meantime two finished trays of material at the leading end of the two continuous lines of trays extending through the length of the equipment have come into position upon a portion of the roller hearth adjacent to the discharge end of the equipment suitably arranged for accelerated drive. The automatic closing of a limit switch at this point opens the discharge door and rapidly conveys the two finished trays of material into the discharge lock chamber, after which the discharge door automatically closes. This operation indicates by means of a signal light that there is now sufficient space within the furnace chamber for two more trays of material at the trailing end of the line of trays.

When this space is cleared, as determined by the electrical interlock features on the equipment, the charging door opens, and that portion of the roller hearth at the charging end of the equipment, including the rolls in the charging lock chamber, is actuated, moving the two trays of material rapidly from the charging lock chamber into position at the trailing end of the line of trays, after which the accelerated drive is cut out and the charging door closes.

The operator then manually removes the two trays of material from the discharge end lock chamber, moving these directly on to the transfer buggies across the discharge extension prior to dumping the tray. After the material has been removed from the tray, each tray is placed upon a conveyor which returns the tray to the charging position ready for reloading.

The arrangements for automatic temperature control are substantially similar to those described in the pusher type equipment, except that one additional zone of control is provided in the slow cooling portion, and an indicating pyrometer only is employed in the discharge end cooling section for continuously indicating the discharge temperature of the material.

Motor Vehicles Gaining in Austria

THE latest census of motor vehicles in Austria was taken on July 1, 1938, and the results together with similar figures for the three preceding years, are given in the following table:

	1935	1936	1937	1938
Motorcycles ..	54,489	59,025	65,029	69,544
Private passenger cars.	25,854	28,933	31,715	33,625
Motor trucks .	15,478	15,320	15,389	16,889
Motor buses ..	2,478	2,545	2,489	2,311
Tractors	217	220	232	252

Austria has been the land of (relatively) expensive cars and expensive upkeep. Being cut off from foreign markets, Austrian manufacturers could produce on a small scale only, and this made their costs inordinately high. For instance, the cheapest Austrian small car, the Steyr 50, cost about 5000 Austrian shillings, as compared with about 3200 Austrian shillings for the Opel 4, a similar car produced in Germany. The Austrian industry was protected by heavy duties, equal to 100 per cent on the list price or about 130 per cent on the price paid by the importer; and by the quota system, which limited the number of cars that could be imported from any one country to 40 per year.

The high prices of cars made it impossible for any large number of the population to buy, and registrations of new cars sank as low as 1433 in 1933 and reached a peak of 4609 for the seven-year period since 1930 in 1937. During 1937, when there were 2489 motor buses in service in the country, only 124 new buses were registered, or 1 in 20, and the proportion was even greater between the motor trucks in service and the new registrations (15,389: 677 or 23: 1). These figures make it appear that the average age of the vehicles in service in Austria must be quite high. As regards commercial vehicles, the expansion of their use was hampered by opposition of the railroads. Development of the private passenger car market was retarded by the high cost of insurance and of garage accommodations. The compulsory third-party insurance on a private car in Austria cost from $55 to $68, and the cost of garaging was almost the same as the monthly rent for a small dwelling.

It is expected that now that Austria has been incorporated in the German Reich, a drive will be

(*Turn to page* 505, *please*)

Ranger Aircraft Engine

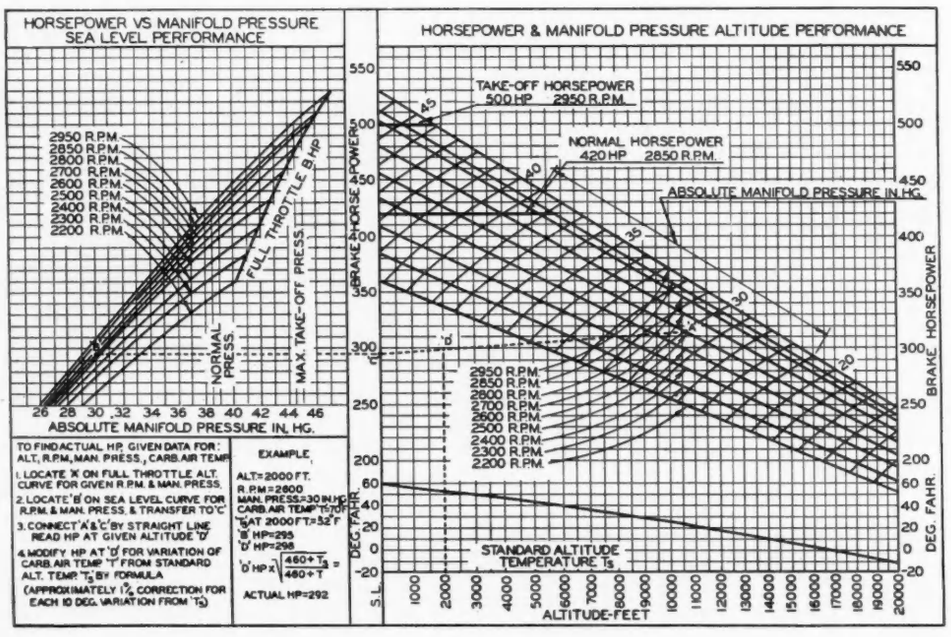
Twelve cylinders,—
Inverted 60 deg. Vee in-line,—
Air cooled and supercharged,—
420 hp. up to 5700 ft. altitude

SPECIFICATIONS have just been released by Ranger Engineering Corporation, Farmingdale, L. I., N. Y., of the new Ranger SGV-770B-6 engine, a twelve-cylinder, inverted, 60-deg. V, in-line, air-cooled, supercharged aircraft engine. The engine recently completed its Civil Aeronautics Authority type test, and approved-type certificate No. 207 was issued for it. It is approved for a take-off rating of 500 hp. on 87 octane fuel, this horsepower being available up to 1700 ft. altitude. The normal rating is 420 hp., and applies from sea level up to 5700 ft. altitude. For cruising the manufacturer recommends an output of 300 hp., which can be maintained up to 10,500 ft. altitude.

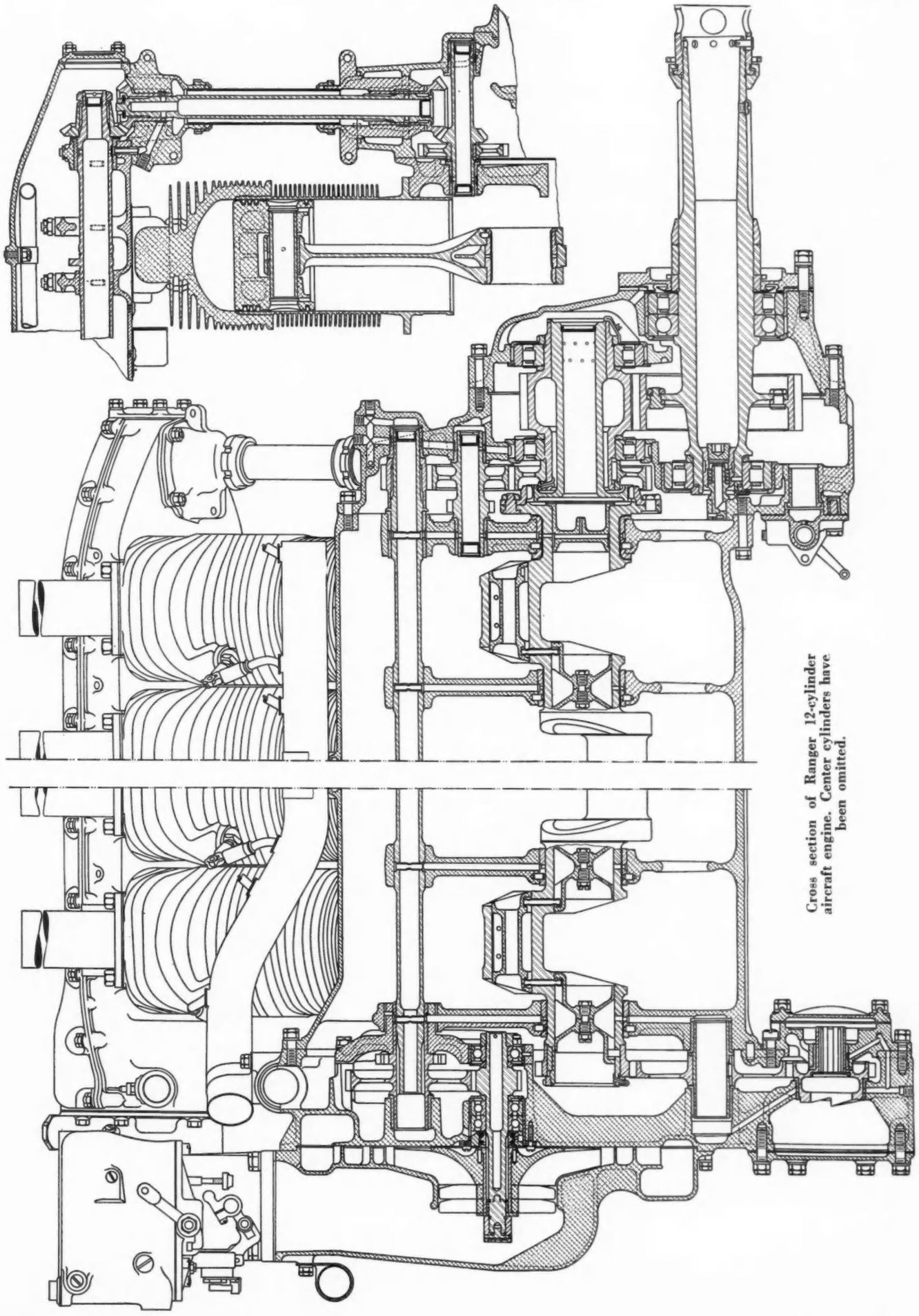
The cylinder bore of this engine is 4 in. and its piston stroke 5⅛ in., which makes the displacement 773 cu. in. A compression ratio of 6:1 is worked with. A longitudinal section (with a central portion corresponding to three cylinders omitted) and a longitudinal section through one cylinder with its cylinder head and piston are shown on the opposite page. Details of design can be gathered from these drawings. It will be seen, for instance, that the crankshaft is supported in seven main bearings formed integral with the upper and lower halves of the crankcase. The updraft carburetor is located at the rear end of the engine and delivers mixture to the cylinders through a centrifugal supercharger which is driven at 8.84 times crankshaft speed. This blower has two outlets, one for each bank of cylinders, and, as may be seen from the photograph, the inlet manifolding is so designed that the resistances to flow of the passages to the different cylinders are substantially equal. The step-up gearing for the blower impeller is divided between the two ends of the engine, one step being at the propeller end, the other at the rear end. These two gear trains are connected by a hollow shaft having its bearings in the crankcase webs which support the crankshaft main bearings. This hollow shaft also serves to supply oil to the main bearings.

The two camshafts, which are mounted centrally below the two cylinder banks, are driven through spur and bevel gearing at the forward end of the engine. Both the camshafts and the bevel-gear drive shafts extending parallel with the cylinders are hollow, and all of the bearings of the valve mechanism are lubricated under pressure through these hollow shafts.

As mentioned previously, the engine is of the geared-drive type, having a single-reduction Herringbone-gear drive combined with it, the reduction between crankshaft and propeller shaft being in the ratio of 3:2. Both the propeller shaft and its drive pinion are mounted in short roller bearings and propeller thrust is taken on a deep-groove ball bearing. To prevent binding in the bearings due to deflections of the light housings, the drive pinion is hollow-forged and is splined to its hollow drive shaft at the end opposite that at which this shaft is driven from



Performance curves of the Ranger 12 cylinder inverted Vee, in line engine



Cross section of Ranger 12-cylinder aircraft engine. Center cylinders have been omitted.

the crankshaft. The hollow pinion shaft, moreover, is driven from the crankshaft through a coupling consisting of two toothed gears with spur and internal teeth, in mesh with each other.

Provision for driving accessories is made at the rear end. The carburetor is a Stromberg NAR-9A. A dual Scintilla magneto is included in the equipment, with two twelve-cylinder distributors, giving two-point ignition. All ignition wiring is plain, that is, without radio-shielding. Such shielding, however, can be furnished as an extra. The lubrication system comprises a pressure oil pump and two scavenging pumps. In normal operation oil enters the engine at between 140 and 170 deg. Fahr. At rated power the oil absorbs 900 B.t.u. per minute, and oil is circulated at the rate of 60 lb. per minute.

Valve timing is as follows: Intake opens 15 deg. before top center and closes 65 deg. past bottom center; exhaust opens 70 deg. before bottom center and closes 30 deg. after top center. There is thus a considerable overlapping of valve periods, which undoubtedly favors cylinder cooling. As regards cylinder temperatures, the manufacturers state that, using a spark-plug-type thermocouple, the cylinder head should never show in excess of 500 deg. Fahr. and in continuous operation, not over 400 deg. Fahr. Similarly, the barrels, with an embedded couple, should not show in excess of 280 deg. at any time, and not in excess of 240 deg. in continuous operation.

The engine is designed to operate on 87-octane fuel and its specific consumption at cruising power is given as 0.52 lb. per hp.-hr. Lubricating oil for use in this engine should have a Saybolt viscosity of 100 seconds at 210 deg. Fahr. for winter, and 120 seconds for summer use. Oil consumption is given as 0.025 lb. per hp.-hr. at rated power, and 0.015 lb. per hp.-hr. at cruising power.

Looking at the engine from the rear (and numbering cylinders from the rear) the firing order is as follows: 1R-3L-4R-5L-2R-1L-6R-4L-3R-2L-5R-6L. The dry weight of the engine is given as 640 lb., but this does not include the following items of standard equipment: Hydro-propeller control valve (0.82 lb.), baffle assembly (3.50 lb.), propeller-hub attaching parts (2.91 lb.), exhaust flanges, gasket, and attaching parts (2.51 lb.), primer fittings (0.40 lb.), mounting feet (1.71 lb.), lifting eyes (0.79 lb.), tool kit (4.66 lb.), log book (0.05 lb.), and instruction book (0.60 lb.).

Additional equipment for this engine furnished at extra cost includes the following items (with their respective weights): Cooling-air scoop assembly (20.0 lb.), twelve exhaust stacks 16 in. long, in addition to flanges (12.6 lb.), 14-volt, 12-amp. generator with voltage regulator (17.6 lb.), Packard-type radio shielding, additional over plain wiring including spark plugs (7.5 lb.), and drive for a constant-speed propeller governor (0.79 lb.).

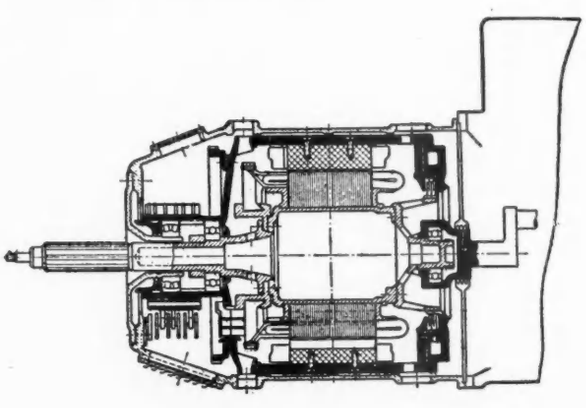
Sousenik Electro-Mechanical Transmission

A novel type of electro-mechanical transmission is being used on two railcars in service on the Czechoslovakian State Railways. These are four-axle railcars weighing 36 tons empty. Each of the two trucks of each car is equipped with a gasoline engine of 160 hp. at 1300 r.p.m.

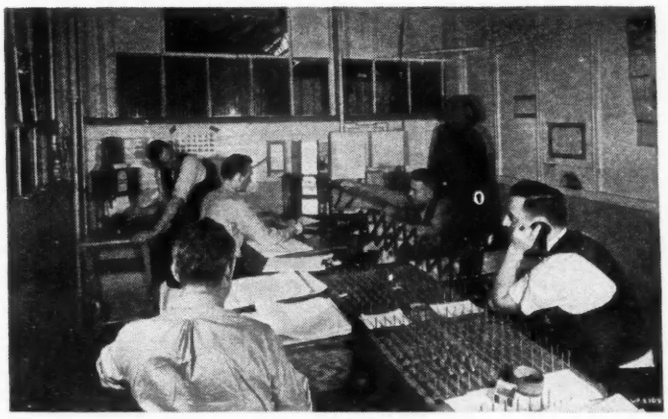
On these railcars use is made of a novel transmission which is designed to combine the smooth acceleration of the straight electric drive with the high efficiency of the direct mechanical drive. With electric drive in normal operation, some 20 per cent of the power of the engine is lost in the double transformation of the energy, and this is avoided by the use of the Sousenik transmission.

As shown in the accompanying drawing, an electric generator of special design is interposed between the engine and the propeller shaft. The field frame of this generator (shown in black in the drawing) instead of being fixed, is elastically coupled to the engine crankshaft. The generator armature has the propeller shaft connected to it. There are slip rings on the rotating field frame through which current is conducted to the field coils. The armature and field frame may be locked together by means of a disc-type electro-magnetic clutch. This aggregation of parts is completed by an electric motor geared to any rotating part of the drive through a free-wheeling unit.

The gasoline engine being in operation, the generator, whose field frame rotates with the crankshaft and whose armature is stationary, begins to send current through the electric motor, and the vehicle starts. Under starting conditions, some torque is being transmitted to the propeller shaft by the magnetic drag between field frame and armature, and additional torque is furnished by the electric motor. As the speed of the car increases, the speed of the field frame relative to the armature decreases, with the result that less electric energy is generated and more and more of the power of the engine is transmitted directly to the propeller shaft through the air gap of the generator. At about 85 per cent of the maximum speed an equal percentage of the total power is thus transmitted. At that moment the electro-magnetic clutch between the armature and field frame of the generator is engaged. A certain amount of slippage takes place between the clutch plates, but the two parts are rapidly synchronized and are then rigidly coupled together. The electric motor then receives no more current and may be disconnected.—*La Technique Moderne.*



Sectional view of electric generator forming part of the Sousenik electro - mechanical transmission.



Production Lines

Nerve center of Plymouth assembly plant is like a railroad "dispatcher's office." From this point issue the telautograph orders and "truck sheets" that control the flow of parts and materials to the assembly line

Constant Velocity

Well-known mathematician, inventor, gear specialist has given us a copy of his patent application for a novel type of constant velocity universal joint and wheel driving mechanism. It will tolerate an angularity of 35 degrees with negligible error. Developed for application to front wheel drive, rear engine drive, independent rear suspension, and other types of special mechanism, important feature appears to be a simplified mechanical design lending itself to conventional machine shop procedures. We have the details of the joint and will be glad to put you in touch with its originator. Just say the word.

Rainbow Hues

The Repaint Reporter, a publication of Ditzler Color Co., which by the by is loaded with interesting and informative material, arrested our attention with the contents of the November number. This folder gives the complete range of colors for practically all '39 motor cars, not only descriptively but in terms of Ditzler's series. The publication is intended for the use of jobbers and repair shops but at least this particular issue should be on your desk.

Takes Bulge

Neatest design trick in a long time is unobtrusive detail of recently patented body for rear engine car. During past few years, what with introduction of well-sealed bodies, car owners have complained about the difficulty of closing doors due to compression of air confined in body with windows closed. This has been a particularly annoying problem on two-door sedans because of the large doors. The patent, which is a matter of record, covers the use of a rubber membrane section in the front dash. It yields and expands into front compartment when a door is slammed, neatly contracts when door is closed.

Dust and Fumes

Although exhaust ventilation has been practiced for some 70 years, the literature on this subject has been amazingly scanty. What with the growing application of dust and fume control in all manner of industrial establishments there has been a need for a reliable guide in the design and erection of effective and economical exhaust systems. For this reason, plant engineers will be interested in a new book on the subject —"Design of Industrial Exhaust Systems"—by John L. Alden, published by the Industrial Press. Object of the author has been to dispel some of the mystery surrounding the technical phases of the subject. While he is frank to admit certain shortcomings in the present text, he is convinced that sufficient data have been presented for an adequate treatment of design factors and evaluation of bids submitted by contractors. The subject matter has been logically arranged for the convenience of the designer. It embraces the theory of air flow, application of this theory to practical design, selection of commercial units, construction of the plant and testing of the completed system. Every phase of the subject is covered in its fundamental mathematics and scientific analysis, tempered by empirical values based on current practice and published literature. This first edition merits your serious consideration.

Oil Filters

Important corollary of the session on oil filters at the SAE Annual Meeting was the suggestion that the trend in heavy equipment design is to the adoption of adequate filters built-in as an integral part of the engine. This would assure correct mounting and connections, facilitate maintenance. It is worthy of mention, too, that with the advent of the new types of filters now available for passenger cars, we may see such units either generally adopted as standard equipment or most certainly as a wanted option, installed at the factory.

Timely Review

Thumbnail sketch of the improvements made in petroleum products in recent years is found in the current issue of *Lubrication*, Vol. 25, No. 2. It touches upon advances in automotive fuel research, control of vapor lock, aviation lubes, industrial lubes, solvent refining, grease research. Designed for quick reading, it's packed with meat and deserves a reading. If you are not on the list, we'll undertake to get it for you.—J. G.

Three Steering Mechanisms for Tracklayer Tractors

TRACKLAYER-TYPE tractors were originally developed to operate at low speeds, and when they are required to run at high speeds, as in certain military operations, new problems arise, especially in connection with steering and springing. These and other problems were discussed in a paper entitled, "Some Considerations Influencing the Design of High-Speed Track Vehicles," which Dr. H. E. Merritt read before the Institution of Automobile Engineers recently. Several methods of steering such tractors were discussed.

The system illustrated in Fig. 1 is known as the clutch-brake steering system. The drive to the inner track is disconnected by de-clutching, and a brake is applied to that track. It is obvious that the steering brake absorbs considerable power. It is figured by the author that for a vehicle weighing 10,000 lb., if the half length of the track in contact with the ground is 40 in., the half width of the tread, 30 in., the coefficient of adhesion between track and ground, 0.5, and the tractive force required at 30 m.p.h., 750 lb., the force on the outer track when making a turn must be approximately 2000 lb., which, at 30 m.p.h., means a power loss of 160 hp. in the brake.

With clutch-brake steering, a phenomenon referred to as "reversed steering" sometimes occurs. If the vehicle is descending a gradient with the throttle closed, release of one steering clutch will free the associated track, and all of the drag torque of the engine then comes on the other track. If the adherence between track and ground is low, this will cause the vehicle to skid around in the direction opposite to normal, and this can be quite disconcerting. Such a skid can be rectified by continuing the steering motion to bring the approximate steering brake into engagement.

A system which has extreme simplicity to commend it, but nothing else, is that known as differential braking, which is illustrated by Fig. 2. Obviously it is only necessary to apply a brake to one of the side shafts of a differential to obtain a difference in torque. Unfortunately, only one half of the available torque goes to the driven track, the other half being absorbed by the brake. Further, the loss of tractive effort on the driven track demands increased braking effort on the other.

In the numerical example given in the preceding section, the substitution of differential steering would increase the rate of energy absorption by the brake by the equivalent of, roughly, 750 lb. retarding effort at the inner track (about 37 per cent). The retardation on the vehicle as a whole also would be in-

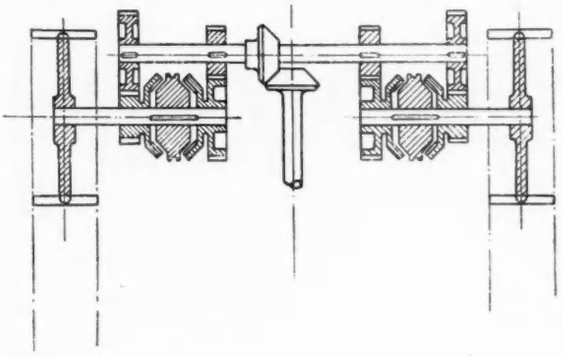


Fig. 3—Geared type of steering mechanism.

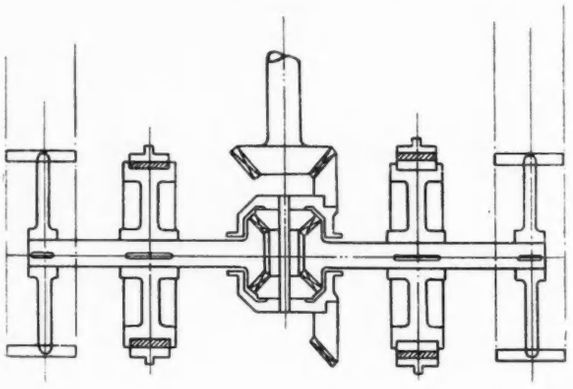


Fig. 2 — Braked-differential type of steering gear.

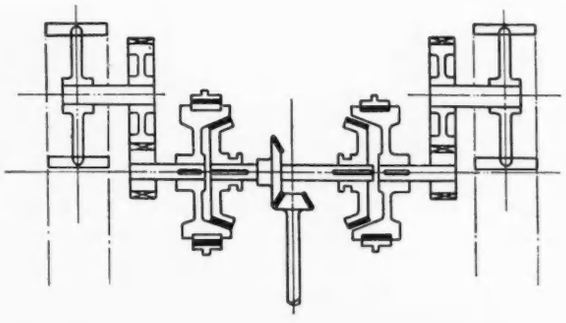


Fig. 1 — Clutch-brake type of steering gear.

creased, roughly, in the ratio of (2000-750)/(2750-375); that is, it would be nearly doubled. As the speed of a given vehicle decreases, the available tractive effort increases, and the torque required of the brake becomes smaller in both the foregoing cases. Eventually a speed is reached at which the tractive and retarding forces are equal, and this "sustained turning speed" constitutes a criterion of the efficiency of the steering system.

The maneuverability of the machine must be judged by another criterion, however. The greater the ratio "length of track/tread" the less responsive the machine will be to a slewing torque due to differences in traction on the two tracks. This responsiveness, however, is not a function of this ratio alone, for to initiate a turn, angular acceleration is necessary, and this involves the moment of inertia of the vehicle around a vertical axis. In that case the criterion is provided by the value of the coefficient of adherence between track and ground at which enough excess slewing torque can be produced to give some arbitrary angular acceleration.

Another method of producing the required difference in tractive effort is by gearing the tracks at different speeds by a change-gear arrangement, as shown diagrammatically in Fig. 3. In any steering mechanism operated by friction clutches, the frictional losses in the clutches obviously become zero when slipping ceases. The vehicle then will move in a circle of radius dependent on the ratio of track speeds, and the principal source of power loss lies in the skidding of the tracks themselves.

Such a system acts as a power-circulating system both while the steering clutch is still slipping and after slippage has ceased, the same as would the driven axles of a multi-wheeled vehicle if they were geared differently. Torque is transferred from one sprocket to the other, corresponding to the difference necessary to cause the tracks to skid, and in making a turn at high speed, the horsepower "circulated" from one track to the other may far exceed that which the engine can develop. Provided the gearing between the sprockets is capable of handling the "circulated" horsepower, this does not matter. What is important is that when clutch slippage has ceased, the horsepower saved as compared with clutch-brake or differential steering is available for increasing the sustained speed of turn.—*Journal of the Institution of Automobile Engineers.*

Motor Vehicles in Austria

(*Continued from page* 499)

made to increase its "mechanization." At the time of the "Anschluss" there was only one car to 55 heads of the population in Austria, as compared with one to 21 in Germany. The bulk of the passenger cars now in use in Austria are models dating from 1919 to 1927. It has been suggested that these old cars should be either ruled off the road or taxed out of existence, and that the Austrian market be given preferential treatment with respect to the supply of cars from other parts of Germany. Since the "Anschluss" car prices are said to have decreased materially.

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SERVICE PROVED INDUSTRIAL OILS

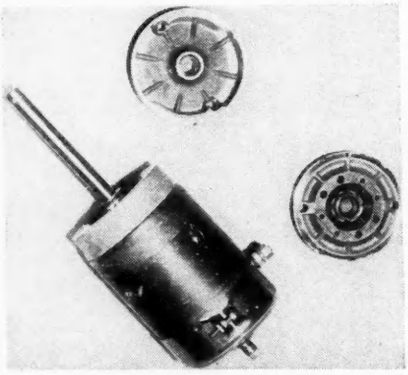
New Developments in Automotive Materials

(*Continued from page* 495)

moved from the engine with the draining of the engine oil. For the time being this new solvent will be sold as Gunk Piston Varnish Solvent.

Ford Tries Magnesium Alloy Die Castings

Die castings of magnesium alloy are being tried out by the Ford Motor Co. The castings are used

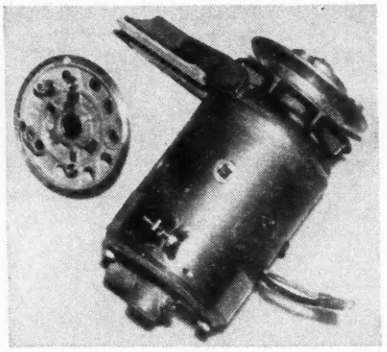


Ford starting motor for passenger cars, showing separately and in position on the starter the new die cast magnesium alloy end plates

for both the front and rear end plates on the starting motor for passenger car engines and for one end plate on the lighting generator, in which applications aluminum alloy die castings have been used heretofore. The new castings weigh, respectively, 3⅛, 3½ and 5½ oz. and, although they do not in this instance have much significance in weight saving in the car as a whole, other possible applications might have if the current application is found to work well in practice.

Immediately after machining, in which relatively little metal is removed, the castings are given a mild chromic acid treatment (Dow Treatment No. 1) to improve corrosion resistance and, in the subsequent assembly, are painted black. The alloy used is understood to contain (nominally) 9 per cent aluminum, 88 per cent (min.) magnesium, with small and possibly variable amounts of zinc and silicon. This alloy has a specific gravity of 1.81 and is said to have a tensile strength of 33,000 psi., a yield strength of 21,000 psi., elongation of 3 per cent, impact strength of 2.0 ft-lb. and a hardness of 60 Brinell.

At least two die casters are now producing magnesium alloy die cast-



Ford lighting generator for which the end plate at the commutator end is now being die cast in magnesium alloy. The interior face of this casting is shown in the separate view and the outer face on the assembled generator

ings on a commercial scale, but this is believed to be the first passenger car application, at least on a large scale.

Single-Coat Primer for Rubber Coatings

Single-coat liquid-rubber primer coating material that dries cold to a solid surface within an hour and withstands temperatures to 212 deg. Fahr. has just been developed. Known as Self-Vulc "M-A" Single Coat Primer, this product is intended for bonding Airvulc liquid rubber to metals, concrete, glass, tile, brick, etc. Used alone it rust-proofs and waterproofs many kinds of surfaces.

This fast-drying primer is the first coat upon which the liquid rubber is applied for rubber-lining acid and pickling vats, tanks, tubs, fans, blowers, air ducts, plating racks, filter press plates, tail shafts, and marine outboards. The "M-A" primer and rubber coatings are made by Self-Vulcanizing Rubber Co., Chicago.

Meehanite for Truck Trailer Brake Drums

Cooperative research under the auspices of the Meehanite Research Institute, Pittsburgh, Pa., in conjunction with the General Foundry & Mfg. Co., Flint, Mich., has resulted in the development of a new use of Meehanite cast iron in the manufacture of heavy-duty truck trailer brake drums. The drums, now used by Fruehauf Trailer Corp., Detroit, range in diameter from 18 in. to 19½ in. and weigh from 80 to 115 lb.

Special ribs or fins were designed for the outside of the drums to give better dissipation of heat, and new manufacturing equipment (illustrated) was developed to mold these ribs. The ribs are rolled in this equipment in green sand, eliminating the necessity of using cores. The photograph on page 494 shows the cope and drag equipment, together with the power-driven slick which is also a Meehanite casting.

Meehanite iron is said to be especially adaptable for use on heavy-duty brake drums because of its metallurgical constitution, which causes the metal to finish with a mirror surface and which does not gall under extremely severe use.

Wrinkle Finishes Now Made in All Colors

Recent developments have made it possible to produce wrinkle finishes in all colors, including pure white, light shades, and pastels. As pointed out by G. Klinkenstein, vice-president and technical director of Maas & Waldstein Co., Newark, N. J., these new finishes are low in viscosity, have excellent covering properties, and can be applied with a uniformly fine grain. Good results are obtained by spraying on light, wet coats using air pressures of from 8 to 10 lb. for the fluid pressure, and from 65 to 70 lb. for atomization. The pressure tanks should be equipped with air motors so that the uniformity of the material will be maintained continuously. On exposure to air, these new finishes alter rather rapidly, so the quantities

SAE World Congress

(Continued from page 481)

on Hydraulic Torque Converters will be given in the New York meeting. From 1931 to 1933 he was visiting professor of hydraulics at the Massachusetts Institute of Technology.

Dr. Robert J. Nebesar, chief engineer, Avia Aircraft Corp., Prague, Czechoslovakia, and formerly on the engineering staffs of Lockheed and Glenn L. Martin Co., will bring the Congress the results of his thorough study and experimentation of trans-Atlantic design problems. Dr. Nebesar's recent work has been on military aircraft, and his rich background of American, French, and Italian aircraft experiences promises a most important contribution to the technical literature of the Congress.

Official representation of many of the 35 foreign countries, invited by the society to participate in the Congress, have reserved accommodations for the Congress.

placed in pressure tanks should not exceed a few hours' supply.

For rapid production, the finishes are made in quick drying types which must be baked within 15 min. after finishing, but slower drying types can also be furnished. The baking schedule is one hour at from 225 deg. Fahr. to 250 deg. Fahr.

After baking, according to Mr. Klinkenstein, the coating is very hard and wear resistant. One coat is all that is needed if a single color effect is desired. Attractive results can be obtained by using bronze powders with the colored wrinkle enamel, and by coating sections, banks, or designs in contrasting colors of lacquer-enamels over a single color of wrinkle enamel. The finishes are suitable for use on almost any kind of surface.

Quick Drying Black Enamel

A new black enamel has been developed by the du Pont company for the automobile refinishing trade. It was designed expressly for touch-up and repair work when speed is essential. It hardens more rapidly than blacks previously available and is quicker drying. It may be rubbed and polished soon after application without assuming a gray tone. Rubbing compounds do not affect the color.

The new finish, known as "Ebonblack" pyroxylin enamel, may be reduced in proportions of 2 to 1 with "Duco" Lacquer Thinner.

CHILTON ROUND TABLE

(Continued from page 492)

"How's Business?" pages of each issue. This list, as it appears every month, probably never duplicates the exact experience of any individual wholesaler—yet many jobbers will find among the 20 that are given a certain amount of prominence a majority of the lines which they, too, find are selling well currently. Since it represents the composite experience of a fairly large group of wholesalers it offers an interesting check list from which the individual jobber can frequently get ideas that will help him stimulate his own selling program.

From Motor Age

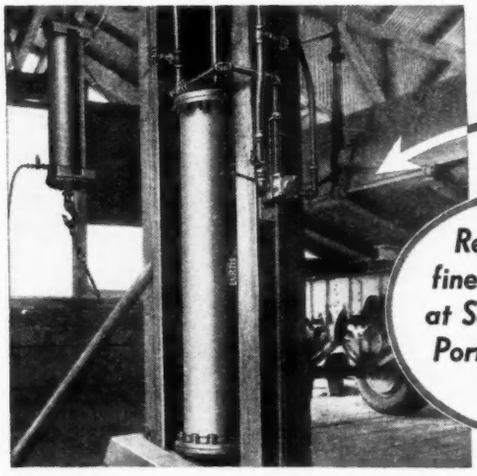
It is virtually an open secret that at least one major oil company is going to market gasoline of 80 octane rating at "regular" gas price. Undoubtedly, all the major companies will have to fall in line and increase the anti-knock value of their fuels, with the result that the premium fuels will probably be increased to 85 octane and the regulars to 78 and 80 octane.

Service stations can capitalize on this situation by increasing the compression ratio of their customers' engines. It is a simple operation. All that is necessary is to plane or mill metal from the cylinder head.

Canadian Aircrafts Picks Plant Site

The site for the assembly plant of the Canadian Associated Aircrafts Limited, where experts will assemble the Handley-Page bombers of the Hampden type bombers to be built for the British Government by Eastern Canada firms, has been secured and will be adjoining St. Hubert, Que., Airport. Construction of the plant will begin in June. Plans for it and also for the assembly plant at Malton, Ont., are now being prepared.

CURTIS AIR HOISTS
on a tough job



Records show fine performance at Southern States Portland Cement Company

Two Curtis Air Hoists at the Rockmart, Georgia plant of the Southern States Portland Cement Company have helped to speed up operations, and reduce costs. One hoist is used to tilt loaded dump trucks into the hopper; the other to lift large boulders stuck in the crusher. Each does its job dependably and efficiently requiring a minimum of attention. (A third Curtis hoist has since been installed.)

This installation is an example of the limitless uses to which Curtis Air Hoists can be put even under unfavorable conditions. Simple in construction with only one moving part, Curtis Air Hoists are rugged and immune to injury from overloads or bad atmospheric conditions. They can be operated with ease and accuracy by unskilled labor. First cost is low, the power consumption small, and upkeep negligible.

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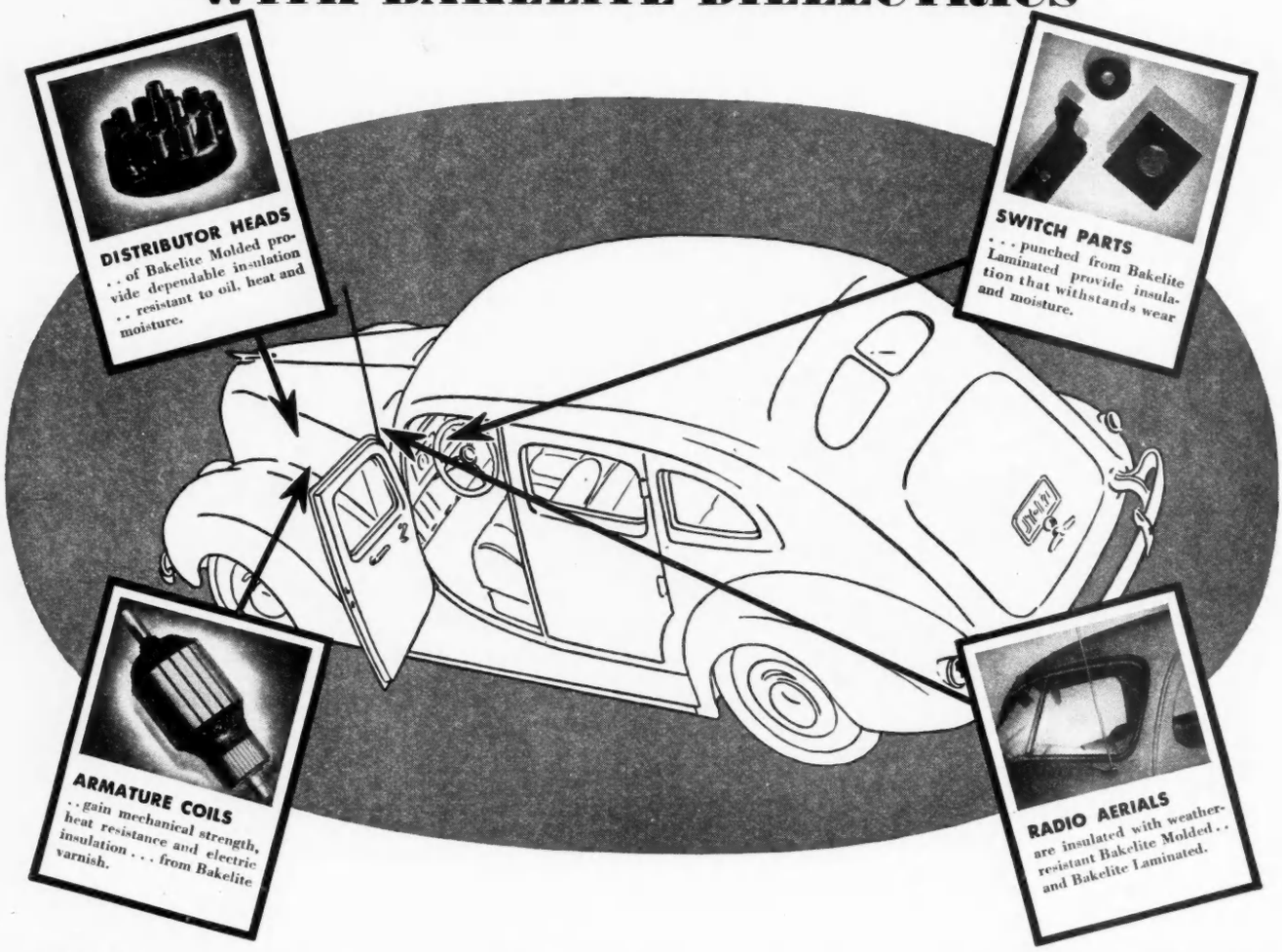
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. . of Bakelite Molded provide dependable insulation . . resistant to oil, heat and moisture.
SWITCH PARTS
. . . punched from Bakelite Laminated provide insulation that withstands wear and moisture.
ARMATURE COILS
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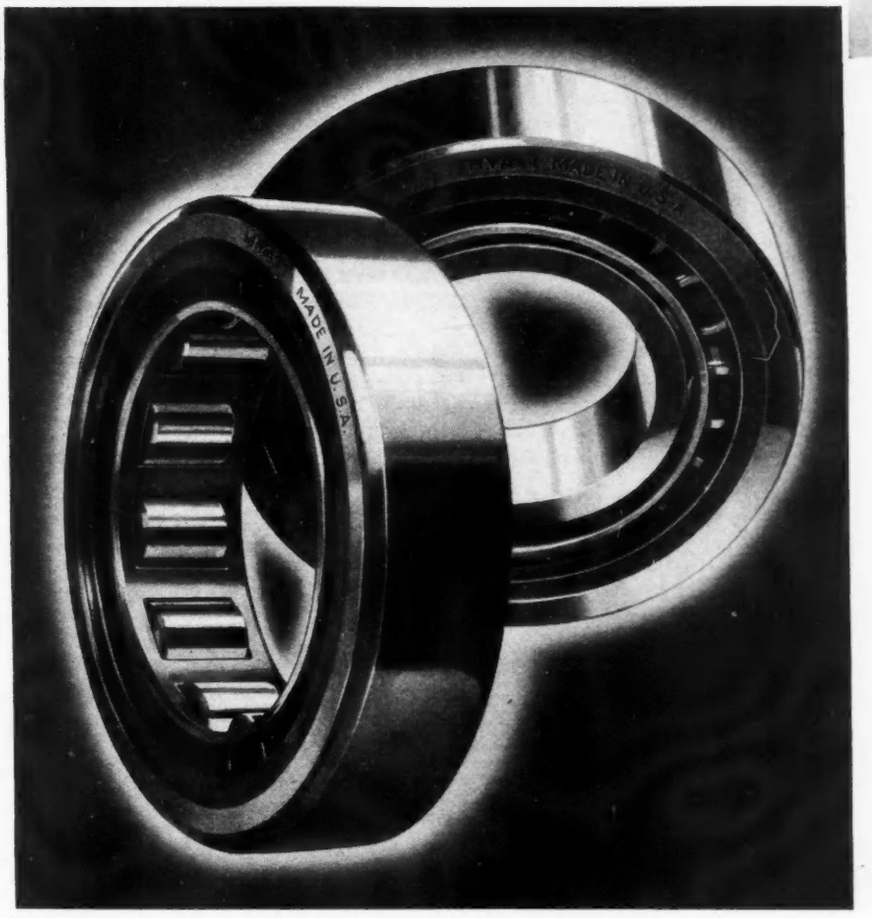

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